



FRIDAY, AUGUST 5, 1898.

CONTENTS

ILLUSTRATIONS:	PAGE.	GENERAL NEWS:	PAGE
Class G-6 Consolidation Locomotive of the Chesapeake & Ohio.....	558	Locomotive Building.....	569
A New Locomotive Cylinder.....	559	Car Building.....	569
Providence Passenger Station.....	560	Bridge Building.....	569
Gold's Improved Electric Heater.....	563	Meetings and Announcements.....	569
New Pullman Parlor Cars.....	566	Personal.....	570
The Whomies Pneumatic Fire Reducer.....	563	Elections and Appointments.....	570
A Bit of Difficult Location.....	567	Railroad Construction.....	571
		Electric Railroad Construction.....	571
		General Railroad News.....	572
		Traffic.....	572
CONTRIBUTIONS:		MISCELLANEOUS:	
The Improvement of the Locomotive.....	557	Technical.....	567
Inspection of Automatic Signals by Trainmen.....	557	The Scrap Heap.....	568
Normal Clear and Normal Danger.....	557	Egyptian Railroad in 1897.....	567
		Convention of the American Society of Civil Engineers.....	559
EDITORIALS:		A Storage Reservoir for a Railroad Water Station.....	560
The "Cleveland" Locomotive Cylinder.....	564	Westinghouse Steam and Gas Engines and Generators.....	561
The Co-ordination of Investigation.....	564	The Engineer and His Country.....	562
Buckling of Trusses on Brooklyn Bridge.....	561	Automatic Electric Signals on the Boston & Albany.....	562
EDITORIAL NOTES.....	564, 565	Concrete Fence Posts.....	562
New Publications.....	565	Train Registers.....	566
Trade Catalogues.....	565		

Contributions.

The Improvement of the Locomotive.

New York, July 22, 1898.

To the Editor of the Railroad Gazette:

Allow me to call your attention to one or two typographical errors in my letter, published in your number of July 22. The first one is the use of a division sign between the 25 pounds and 5280 ft.; it should have been 630 x 25 x 5280 ÷ 33,000 = 2,520 H. P. The other was the sensible temperature of steam at 6½ lbs; you have it 66 lbs.

As regards your editorial remarks: In a number of instances the limit has been more than reached and passed in locomotives already constructed, and, if all forces involved in the operation of these locomotives at high speeds were considered at their full value, these same engines would not be allowed to operate over the roads for which they were constructed; and, while the weight and heating surface of these engines have been nearly doubled from what was the practice a few years ago, the grate area remains the same, and many locomotives are trying to burn 225 lbs. of coal per square foot of grate per hour; and it has been demonstrated that 33 per cent. of the coal goes out of the stack unconsumed—not even coked. Yet, owing to the greatly increased loads these heavy engines can pull, as compared with the lighter engines, they are coming into use, regardless of the above mentioned facts.

As to your remarks regarding feed water heaters on locomotives, I will excuse you for criticising details of something you have not seen. To condemn a thing on general principles, because feed water heaters have not been adopted, is not a fair way of discussing a thing, the need of which is so apparent. Such an apparatus does not only relieve the boiler of 20 per cent. of its work, but will also so purify the feed water as to entirely prevent the formation of scale, and the pitting of tubes, and the burning out of fireboxes after they are covered with scale.

As to the demand for engines to pull trains of 12 cars at 60 miles per hour, I would say that the writer was called upon and did this kind of work 10 years ago, and there are many roads where double headers are being used to-day, both here and in England, as mentioned by Mr. Acworth in his letter, published in the number of July 8, where, if a single locomotive can be made to do it on the coal burned by one of the engines forming the double header, it is bound to be the locomotive used in the immediate future.

GEO. S. STRONG.

[Mr. Strong must divide with the proofreader the blame for the typographical errors. He read the proof. The other points call for no further discussion now.—Editor Railroad Gazette.]

Inspection of Automatic Signals by Trainmen.

Lexington, Ky., June 19, 1898.

To the Editor of the Railroad Gazette:

In your issue of June 10, page 414, you state that "on the Atchison, Topeka & Santa Fe there is now in force a regulation requiring rear brakemen to note and record the condition of signals, and the results of the employment of this regulation for a considerable time have been so favorable that it is intended to

have it applied more extensively." "It is now in use only on night passenger trains."

On this road (the Cincinnati, New Orleans & Texas Pacific) this regulation has been in force for the last four years, and it is not only used on night and day passenger trains, but also on night and day freight trains, in fact, it includes trains of all classes, the rear brakeman, or flagman, being required to note the position of signals after the train passes them, also whether or not signal lights are burning and to make a written report of any failures of this sort at the first open telegraph station. The blank used for this purpose has numbered questions, which, being marked "Yes," by the engineer or flagman, can be briefly telegraphed. The classification of causes reads: "1. Train in section; 2. Rail broken; 3. Track being repaired; 4. Switch open; 5. Cause unknown; 6. Light out on signal No. —." Thus, "4 yes" would mean that automatic signal No. — failed to turn for the reason that a switch was open.

On this road the practice of allowing the signal to come to danger in the face of the engineman has been in operation for some four or five years with excellent results.

Some railroad officers do not approve of thus allowing trains to run under a red signal, but on the C. N. O. & T. P. the practice has been productive of good results. The engineman knows that he is setting the signal at danger, as the beginning of the block proper is marked by a block post of special design. It is impossible for two trains, going in opposite directions, to enter the block at the same time, provided, of course, one signal has an opposing signal at the other end of the block. Strictly speaking, it is not a block in single track work unless it is a portion of track that is protected by two signals, governing trains in opposing directions. In single track work all our blocks have overlaps, or preliminary sections, which are simply portions of track connected to one signal of a block and extending outside of the block proper into an adjoining block or into a piece of unprotected track, as the case may be. By this method it is impossible for trains going in opposing directions to reach the block at the same time, as a train going in one direction sets the opposing signal for "head on" protection at least 2,000 feet before entering the block proper and setting the signal for rear end protection. It seems to be imperative in single track work to have the engineman see the automatic electric disk change in front of him, as it is then an absolute indication that the block is not occupied and it is safe to proceed.

No matter how efficient the inspection of the signal department, there is bound to be, occasionally, a signal which works improperly and fails to assume the danger position on account of damage by lightning. This may often happen within the hour after the signal inspector has inspected any particular relay. On the C. N. O. & T. P. a stationary signal is regarded as a danger signal. This applies also to train order signals. If an automatic signal does not work the train must stop, send a flagman in advance immediately, wait five minutes after the flagman has started, and then proceed under full control.

W. A. D. SHORT,

General Foreman of Signals.

[The chief difference between the Atchison practice and that described by Mr. Short, and an important one, is that on the Atchison the flagman has to regularly report the condition of every signal on every trip. It was with reference to this feature that we spoke of the practice as an experiment. A flagman may have to report failures once a week or once a month, but if he reports on signals which are normally working, he makes a report, containing scores of items, daily. The single-track automatic block signals of the Cincinnati, New Orleans & Texas Pacific were described in the Railroad Gazette of November 12, 1897.—Editor Railroad Gazette.]

Normal Clear or Normal Danger.

The Union Switch & Signal Co.,
Swissvale, Pa., July 18, 1898.

To the Editor of the Railroad Gazette:

In answer to the eight points of criticism advanced in your issue of June 17 against an article by me which was published in part in your issue of March 25, I should like to make the following remarks, that a closer understanding may be had:

First, of those features of the normally clear system of signaling which appear so objectionable that a change from it is deemed necessary after such extensive adoption.

Second, the manner in which these objections are eliminated by substituting the normally danger for the normally clear method of control.

My paper dealt with certain disadvantages of the new system as compared with the old, rather than with the broader question of the superiority of the latter. The writer is firm in his opinion that the normally danger system of signaling was introduced more as a novelty than as a necessity (in fact, as a means of safely infringing patented devices); that the objections to the modern normally clear system are not well founded and have never been authoritatively

stated; that the confidence reposed in the new system of control is due to a false sense of security felt against derangement that arises from an imperfect knowledge of the actual difference between the two systems; that comparisons between the two are unfairly prejudicial to the old on account of its earlier conception and the existence, in its early applications, of errors in design and installation resulting from the want of that experience which enables its later rival to now assail it; that a comparison which does not eliminate from consideration those elements which are (or which, with equally good results, may be) common to both, is unfair, and must have some other motive than to show the relative values of the two systems in respect to their reliability of operation.

Of the many normally danger methods of electrically controlling automatic signals the writer has had occasion to investigate, he has found not one which cannot be transformed into a normally clear system by simply removing some of its controlling appliances, which to his mind is to simplify and to better it. He has also yet to see a normally clear system that cannot be transformed into a normally danger one by inserting additional controlling appliances to those already in use, and this he believes adds to its complication and detracts from its reliability.

Recognizing the advance of the art possibly beyond his present knowledge, the writer is desirous, as are many others, of investigating a normally danger system that is not capable of the transformation suggested, and which involves a single device that is not equally serviceable if employed in a normally clear system. Until such a system is produced, further comparisons are of little or no assistance in determining a valid cause for changing from the present method of control, and will not assist in arriving at a logical reason for abandoning a system that has recently been brought to a state of perfection.

As to the eight points raised in defense of the normally danger system:

No. 1 is not a criticism, as the facts therein stated were conceded at the beginning of the article, which dealt with causes and effects of like failures in the two systems.

No. 2, as to a large number of normally danger signals never having shown "clear" falsely in several years of service, several equally creditable records are procurable of the behavior of an equal or larger number of signals operated on the old style method, some of fifteen years' service, so that this fact constitutes no proof that they are more exempt from failure, nor would a contrary record unless the equipment of the two signal systems were similar in design and receiving equal care in maintenance.

No. 3. The writer knows that precautions may be taken for this purpose, and that the achievement of the purpose may even be attained, but to his mind the appliances and expenses involved do not warrant their purpose, and their forced introduction into the normally danger system only proves the disadvantages attending that method of control over the older and simpler one.

No. 4. This depends largely upon what standard may be accepted as constituting a thorough test.

No. 5. As to the likelihood of the presence of the man at the time of the signal's failure, the chances are equal in both cases, but as to detecting the failure the chances are vastly in favor of the old system.

No. 6. Unless a comparison is drawn between a normally danger system and one of similar design and of as recent an origin operated upon the normally clear principle, the more favorable record of the former's behavior is not necessarily an indication of its superiority over the other in the broad sense, and the opportunity for such a comparison is not easily obtained. If such comparisons can be made the writer does not doubt the results will show in favor of the old system.

No. 7. Adherence to a principle is always wise when the principle is sound, and the writer offers this as his reason for adhering to the old method of control until the unsoundness of it is proved, and the soundness of its successor's principle established.

No. 8. The writer very much doubts that his views would have been materially altered by a course in maintenance of the normally danger system; he will be pardoned if he presumes that his seventeen years of constant labor in designing and erecting automatic electric devices of various types, and for various purposes, on many different railroads under greatly varying conditions, has enabled him to judge with reasonable accuracy the good and the bad features of two systems so completely alike in many respects, and whose difference consists in the simple extension of the controlling mechanism of one beyond the limits required by the other—involving no new mechanism, no uncertainty of results, and, in truth, no ingenuity beyond that required to conceal the unwarranted purpose of the change.

J. P. COLEMAN.

The Egyptian Railroads in 1897.

The general railroad returns of Egypt, published some weeks ago, show continual gains. In 1897 the receipts exceeded those of any previous year; they

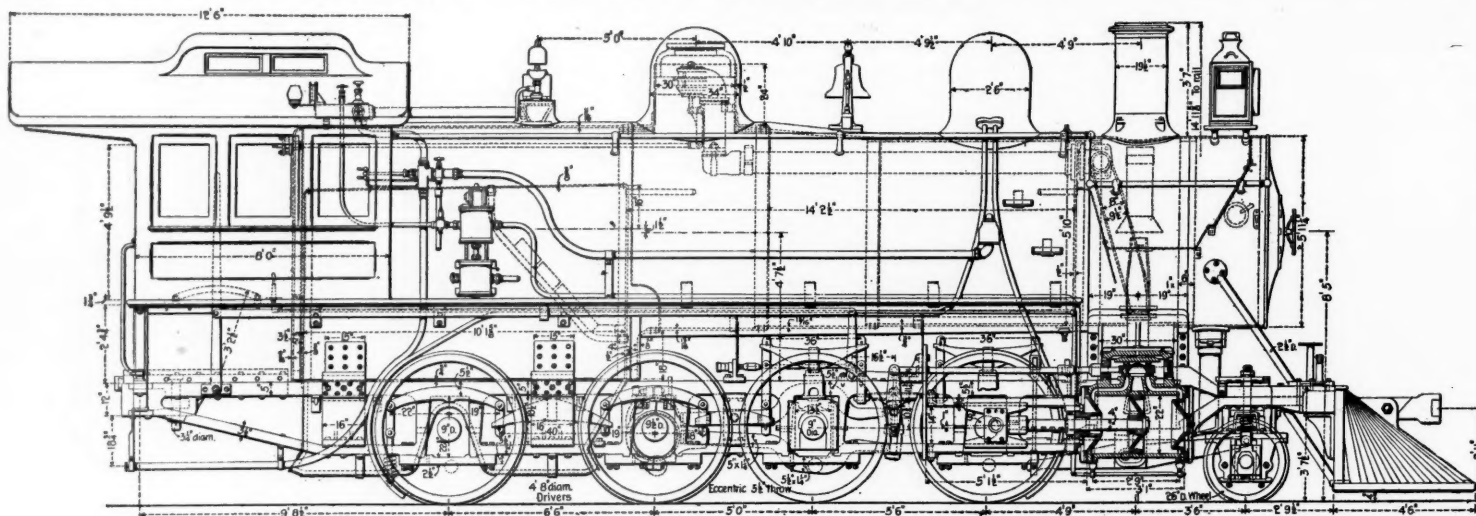
amounted to L. E. 1,821,000 (the livre Egyptienne is worth almost \$5). This figure was, however, surpassed in 1897 by L. E. 162,000. About L. E. 40,000 may be attributed to extraordinary movement of troops, and to transport of materials for the railroad beyond Wady Halfa. About L. E. 20,000 is due to the fact that owing to the cholera epidemic the usual fairs were not held at Tantah and elsewhere in 1896. The balance of L. E. 100,000, may be at-

piston rods will also be of Coffin process steel, and the tender axles of hammered iron. The cross heads and driving boxes will be cast steel.

The tender will weigh about 87,000 lbs. when loaded, and will have a capacity for 7 tons of coal and 4,500 gals. of water. The underframe will be of steel construction and diamond frame trucks will be used, having Simplex body and truck bolsters.

The following is a list of the principal general di-

Boiler, type of.....Extended wagon top.
" working steam pressure.....200 lbs.
" material in barrel.....Acid open-hearth steel.
" thickness of material in barrel..... $\frac{3}{4}$ and $\frac{1}{2}$ in.
" diameter of barrel.....70 in.
Seams, kind of horizontal.....Sextuple riveted butt with inside and outside welt strips.
" " circumferential.....Double riveted lap.
Thickness of tube sheets..... $\frac{1}{2}$ in.
" crown sheet..... $\frac{3}{8}$ in.
Crown sheet stayed with..... $\frac{1}{4}$ in. radial stays.
Dome, diameter.....30 in.



Class G-6 Consolidation Locomotive for the Chesapeake & Ohio Railway.

Mr. W. S. MORRIS, Supt. Motive Power.

tributed to the growing prosperity of the country. The number of passengers conveyed was 10,742,000, as compared to 9,854,000 in 1896; 1,331,000 tons of freight were conveyed, as compared to 1,231,000 tons in 1896.

The working expenses amounted to about 43 per cent. of the gross receipts. Mr. Robertson, the President of the Board, however, remarks that: "The statement of the 'working expenses' is a meaningless figure unless the line has been properly maintained, which is not the case here." An examination of the amount spent on the purchase of rolling stock and rails during the last ten years shows a deficit of L. E. 218,000 from the sums necessary to maintain these items in good order. The buildings also have been neglected, and the running repairs to engines are in arrears. A grant of L. E. 150,000 already made from the reserve fund for the purchase of rolling stock and rails has been increased to L. E. 250,000. Of this amount, L. E. 120,000 will be devoted to the purchase of fifty-five locomotives.

The strike of the engineers in England had for effect that the orders for machine tools for the new shops, which were placed in England in May, for delivery in October, had to be entirely neglected. About half of these orders were transferred to the United States; the other half, on which some little work had been done, was allowed to remain.

Class C-6 Consolidation Locomotive for the Chesapeake & Ohio.

The accompanying engravings show the elevation and principal cross-sections of the new class G-6 consolidation freight locomotive designed by Mr. W. S. Morris, Superintendent of Motive Power of the Chesapeake & Ohio Ry., and a sample engine of this design will be built at once, and put in service before any large number is ordered. This is another example of a heavy modern freight locomotive. In this case one of the main features of the design has been to retain as many as possible of the parts already used as standards; so that the new engine will be of simple construction along the usual lines, and without any radical changes in details.

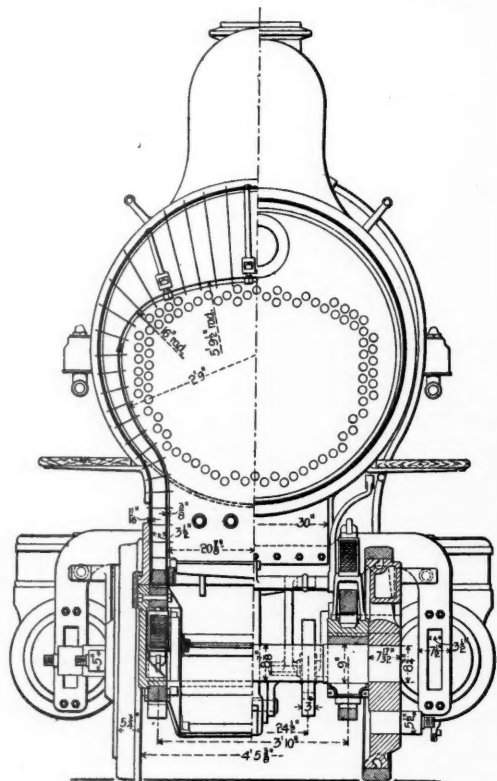
The most interesting features of the design are the great weight, and the large boiler capacity. The weight on the driving wheels will be 165,000 lbs., and the total weight in working order, 184,000 lbs., or but 14,000 lbs. less than the weight of the big class H-5 consolidation "helpers" lately built by the Pennsylvania R. R. The tube heating surface of the C. & O. engine will be 2,566 sq. ft., and that of the firebox 239 sq. ft.; the corresponding values for the Pennsylvania class H-5 are 2,720 sq. ft. and 197 sq. ft.

The boiler of the C. & O. engine will be of the extended wagon top type, built of acid open-hearth steel to carry a working steam pressure of 200 lbs. per sq. in., and must be tested by the makers with a steam pressure of at least 250 lbs. per sq. in., and a water pressure of 280 lbs. per sq. in. The boiler will be covered with magnesia sectional lagging, containing about 85 per cent. of carbonate of magnesia and jacketed with planished iron. The same covering will be used for the dome and cylinders, and the jackets of these parts will be sheet iron. The cylinders are to be 22 in. in diameter by 28 in. stroke, and the driving wheels 56 in. in diameter; the driving wheel centers will be cast iron. The main crank pins only will be of nickel steel, the others being of high-carbon steel treated by the Coffin process. The driving axles and

mensions with the names of the makers of the special equipment:

Description and Dimensions of a Consolidation Locomotive for the Chesapeake & Ohio.

Gage.....4 ft. 9 in.
Fuel.....Bituminous coal.
Weight on drivers.....165,000 lbs.
" truck wheels.....19,000 lbs.
" total.....184,000 lbs.
" tender loaded.....87,000 lbs.
Wheel base, total, of engine.....25 ft. 3 in.
" driving.....17 ft. 0 in.
" total (engine and tender).....42 ft. 3 in.
Length over all, engine.....43 ft. 0 in.
" total, engine and tender.....65 ft. 7 in.
Height, center of boiler above rails.....8 ft. 5 in.
of stack.....14 ft. 11 in.
Heating surface, firebox.....239 sq. ft.
" tubes.....2,566 sq. ft.
" total.....2,805 sq. ft.



Class G-6 Engine—Chesapeake & Ohio.

Grate area.....35.15 sq. ft.
Drivers, diameter.....56 in.
" material of centers.....Cast iron
Truck wheels, diameter.....30 in.
Journals, driving axle, size.....1st, 2d and 4th, 9 x 10 in.
" truck.....3d, 9 1/2 x 10 in.
Main crank pin, size.....7 in. x 6 1/2 in.
Cylinders, diameter.....22 in.
Piston, stroke.....28 in.
" rod, diameter.....4 in.
Kind of piston rod packing.....Metallic.
Main rod, length center to center.....10 ft. 9 1/2 in.
Steam ports, length.....21 in.
" width.....15 in.
Exhaust ports, length.....31 1/2 in.
" width.....1 1/2 in.
Bridge, width.....1 1/2 in.
Valves, kind of.....Richardson balanced.
" greatest travel.....6 in.
" outside lap.....1 in.
" inside lap or clearance.....0 in.
" lead in full gear.....7 in.

Firebox, length.....10 ft. 1 1/2 in.
" width.....3 ft. 5 1/2 in.
" depth, front.....68 in.
" back.....66 in.
" material.....Acid open-hearth steel.
" thickness of side and back sheets..... $\frac{3}{8}$ in.
" brick arch?.....Yes.
" water space, width.....Front, 4 in.; sides, 3 1/2 in.; back, 3 1/2 in.

Grate, kind of.....Rocking, C. & O. standard.
Tubes, number.....347
" material.....Charcoal iron.
" outside diameter.....2 in.
" length over sheets.....14 ft. 2 1/2 in.

Smokebox, diameter.....11 1/2 in.
" length.....72 in.
Exhaust nozzle, single or double?.....Single.
" variable or permanent?.....Permanent.
" diameter.....5 1/2 in.
" distance of tip below center of boiler.....2 in.

Netting, wire or plate?.....Wire.
" size of mesh or perforation.....3 x 3 in.
Stack, straight or taper?.....Taper.
" least diameter.....15 in.
" greatest diameter.....17 1/2 in.
" height above smokebox.....3 ft. 7 in.

Type.....Swivel trucks.
Tank capacity for water.....4,500 gals.
Coal capacity.....7 tons.
Kind of material in tank.....Steel.
Thickness of tank sheets..... $\frac{1}{4}$ and $\frac{1}{2}$ in.
Type of under-frame.....Steel.
Type of truck.....Diamond frame.
Truck with swinging motion or rigid bolster?.....Rigid.
Type of truck spring.....Double elliptic.
Diameter of truck wheels.....33 in.
Diameter and length of axle journal.....4 1/2 x 8 in.
Distance between centers of journals.....5 ft. 10 in.
Diameter of wheel fit on axle.....5 1/2 in.
Diameter of center of axle.....4 1/2 in.
Type of truck bolster.....Simplex.
Length of tender frame over bumpers.....22 ft. 4 1/2 in.
Length of tank.....18 ft. 6 in.
Width of tank.....8 ft. 6 in.
Height of tank, not including collar.....4 ft. 10 in.
Height of tank over collar.....5 ft. 7 1/2 in.
Type of back drawhead.....M. C. B. coupler.
With or without water scoop?.....Without.

Names of Makers of Special Equipment.

Driving and front truck axles.....Cambria Iron Co.
Sight-feed lubricators.....Nathan Mfg. Co.
Bell Ringer.....Golmar.
Safety valve.....Crosby Steam Gage & Valve Co.
Muffler.....Crosby Steam Gage & Valve Co.
Sanding devices.....Dean-U. S. Metallic Packing Co.
Injector.....Nathan Mfg. Co., 2 No. 10 monitors.
Driver brake equipment.....American Brake Co.
Tender brake equipment.....Westinghouse Air Brake Co.
Tender brake beam.....Sterlingworth Railway Supply Co.
Air pump.....Westinghouse Air Brake Co.
Air pump governor.....Westinghouse Air Brake Co.
Steam gages.....Crosby Steam Gage & Valve Co.
Piston rod packings.....C. C. Jerome.
Valve.....C. C. Jerome.
Rivets.....Burden Iron Co.

A New Locomotive Cylinder.

For some time past the Intercolonial Railway of Canada has been experimenting with a new type of cylinder applied to a 16x24 in. passenger locomotive, which is now running between Moncton and St. John, N. B. Mr. D. Pottinger, General Manager of the Intercolonial, says that the engine appears to be working satisfactorily, but little definite information has been obtained to the present time. From other sources, presumably reliable, we are advised that all the engines of that road are to be fitted with the new cylinders as they are taken into the shop for general repairs, but this we do not state as a fact.

This cylinder arrangement is the invention of Messrs. William F. and Eugene W. Cleveland, of Rounthwalte, Manitoba, and it is being promoted by Mr. A. M. Peterson, of Colborne, Ont. Fig. 1 is a cross-section of the cylinders applied to the Intercolonial locomotive, and it will be seen that in this arrangement long steam passages are used, and that live steam is admitted at either end of the piston valve. Fig. 2 is an outline of a modified arrangement to be followed in future constructions, wherein the steam ports are shortened and the ends of the steam chest are open to the exhaust.

The admission, cut off and beginning of compression are controlled by the valve in the usual way, but the point of exhaust opening is fixed by the ports, A A, near the middle of the cylinder. The cylinder exhausts through these passages into the space B between the two pistons and because of the unusually large exhaust ports the escape of the steam is said to take place very quickly. The $\frac{5}{8}$ -in. exhaust ports used with the experimental engine will be made even larger in the next cylinders built. The steam from B passes out through the inner opening in the exhaust nozzle, shown in Fig. 3, while the out-

The papers which were presented have already been printed and distributed, and we shall attempt now no abstract of these papers or of the discussions upon them. As we have said before, the papers were of uncommon value.

At the first meeting, on Tuesday morning, the Mayor of Detroit could not be present, but an address of welcome was delivered by a clergyman of the city, acting for the Mayor. To this the President of the Society, Mr. Fteley, responded, following his response with his annual address, a considerable part of which appeared in our last issue.

For District No. 1, Mr. H. G. Prout of New York; for District No. 2, Mr. John W. Ellis of Woonsocket, R. I.; for District No. 3, Mr. Emil Kuichling of Rochester; for District No. 4, Mr. L. M. Haupt of Philadelphia; for District No. 5, Prof. Ira O. Baker, Champaign, Ill.; for District No. 6, Mr. N. W. Eayrs of St. Louis, and for District No. 7, Mr. Andrew Rosewater of Omaha. The reader will doubtless remember that under the constitution seven corporate members, one from each geographical district, are appointed members of the Nominating Committee, to serve for two years. Therefore, there are seven members holding over from last year besides those appointed this year. There are also five of the past presidents who are permanent members of the committee.

At this meeting the question of the time and place of the next annual convention was brought up, and as usual referred to the Board of Management with power.

The proposed amendments to the constitution, as already submitted to the membership, were acted on favorably by the convention, and will go to letter ballot without change.

The matter of a proposed special engineering committee to consider the subject of rail joints was taken up, and after considerable discussion it was voted to submit it to the membership for letter ballot. An effort to provide for a similar committee to consider the subject of paints was defeated.

Thursday was spent in a visit to the St. Clair tunnel. The Grand Trunk provided a special train which took members to Port Huron, and there they were taken on a train of new gondola cars and pushed through the tunnel by one of the famous engines used for working the tunnel.

Considering the stories that have recently gone about concerning the destructive action of engine gases, this visit to the tunnel was of special interest to some members of the party. It was learned from Mr. Hobson (Chief Engineer of the Grand Trunk) that the only corrosion that has been serious enough to be considered at all was that of the steel bolts through the flanges of the cast iron segments making up the tube. The tube itself has not been appreciably affected. These bolts have been renewed where corroded and the bolt heads and nuts covered by concrete, which has been put in to fill the angle made by the flange with the cylindrical surface of the tube. It will be remembered doubtless that the lower half of the tube was bricked up at the outset and faced with concrete, flush with the flanges. The return trip through the tunnel was made within five minutes or less after the first trip, and there was very little gas or smoke in the tunnel; it could not have been disagreeable except to an unusually sensitive nose. The

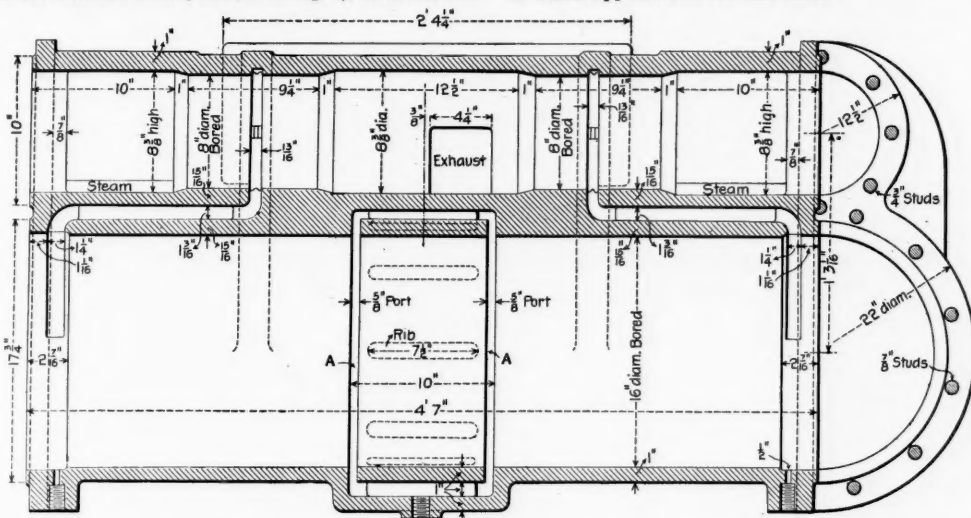


Fig. 1.—"Cleveland" Cylinders as Applied to an Engine on the Intercolonial Railway.

er opening is connected with the exhaust chambers in the valve. It is claimed by the inventors that this nozzle acts as an ejector, creating a partial vacuum behind the piston on the return stroke, and so the back pressure is materially reduced. It is further stated that a back pressure of about 8 lbs. per sq. in. absolute was obtained by a similar arrangement in connection with a stationary engine having "Cleveland" cylinders, but up to this time no indicator cards have been taken from the locomotive.

The chief claims made for the new cylinders are that, as the exhaust does not pass through the live steam passages and because the clearance space is

At the preliminary business meeting the customary announcements were made as to the programme, etc., and the Society was informed that it had the privileges of two fine clubs, the Detroit Club and the Country Club.

At this meeting the preliminary steps were taken to secure the presentation of names for members of the Nominating Committee.

In the afternoon a meeting was held for presentation and discussion of papers, and later a large number of the members and guests were taken through the city on a trolley ride as the guests of the Detroit Electric Railway Company. The cars were run out

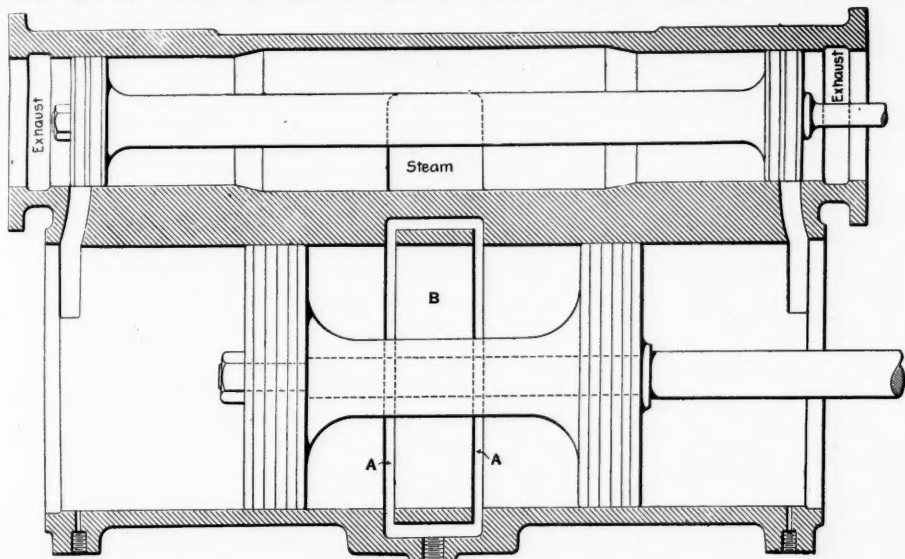


Fig. 2.—Outline of Proposed Modification of the "Cleveland" Cylinders.

small, the condensation before cut-off is reduced, while the reduction of the back pressure increases the power of the engine, enabling it to be run at higher speeds. These factors are also expected to result in a saving of fuel of from 25 to 40 per cent. At this time, however, no tests have been made which would go to show definitely whether these claims are actually fulfilled.

Convention of the American Society of Civil Engineers.

The 13th annual convention of the American Society of Civil Engineers met in Detroit July 26 at 10 o'clock in the morning, according to the programme. A large number of members with their guests went from the East by special train over the Lehigh Valley and the Wabash. From the West also many members reached Detroit by special train furnished by the Wabash. These railroad companies were uncommonly liberal, taking members and their guests to and from the convention without charge. Detroit being a city of many attractions in itself, and being situated so near the centre of gravity of the population of the United States, and so accessible by rail and water, the attendance was naturally large. The latest register that we have seen contains the names of 214 members and 284 guests.

Woodward avenue and back, and then up Jefferson avenue to the water works, where a photograph of the party was taken. To much the greater number of the visitors the beautiful, broad, well paved, clean streets of Detroit and the uncommonly fine electric service were a surprise. The speed is high, the cars frequent and the relations between the public and the employees of the company seem to be unusually friendly. To an outsider the facts that there was no bar on the left hand side of the open cars, and that women and children dismounted on that side whenever they chose, were startling, but we are assured that accidents are very infrequent. In fact, an experienced operating officer of electric railroads said that high speed electric cars do less damage than those which run slower, because the public respects them more and looks out more carefully.

In the evening a very large party went on a steamer excursion as the guests of the Detroit, Belle Isle & Windsor Ferry Company. They were taken up and down the river and had a chance to see the beautiful surroundings of Detroit on the water side.

On Wednesday morning a session was held for the presentation and discussion of papers, and in the afternoon a business meeting was held, at which meeting seven members of the Nominating Committee, one for each of the seven geographical districts of the Society, were elected as follows:

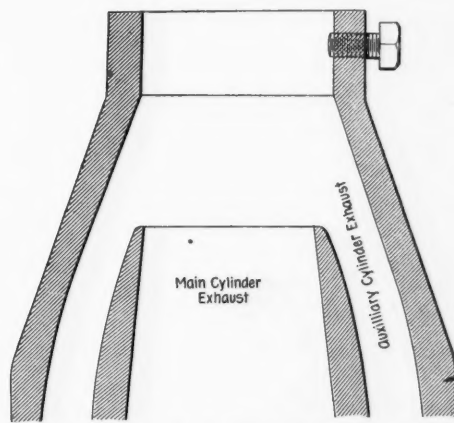


Fig. 3.—Exhaust Nozzle Used with "Cleveland" Cylinders.

engines burn anthracite. The scheme of working requires a minimum interval of 10 minutes between the passage of engines. There is no doubt that the loss of the lives of two men a year ago or so, because of the breaking-in-two of a freight train in the tunnel, was due to the carelessness of the engineman and his disregard of the definite instructions for working in the tunnel. Nevertheless, the consequences of an accident of any sort which should keep a trainload of passengers and an engine or two in the tunnel would be so terrible that some other motive power will probably be adopted, if it can be done with reasonable cost and efficiency of working. The company is now considering compressed air motors and is in correspondence with the American Air Power Company. Obviously, the problem is novel in some particulars, as there is no precedent for motors of the powers which must be used in this tunnel.

From Port Huron to Detroit the party returned by steamer, which gave them an opportunity to see the very interesting waterway through the St. Clair and Detroit rivers.

On Friday morning a final session of the convention was held and in the evening there was a reception given by the Detroit Club to the members and their guests, and so closed what may undoubtedly be called one of the most successful of the Society's many successful conventions.

A Storage Reservoir for a Railroad Water Station.*

One of the appurtenances for operating a railroad which the engineer has frequently to provide or care for is a storage reservoir. Such a reservoir is generally a small affair and quite frequently is dependent upon rainfall for its supply, and generally the waste weir and apron are alternately wet and dry; more often dry. It is a relief to the man responsible for a continuous supply of water to be able to feel that the dam which holds back the water and the passages designed to take its surplus are in permanently good condition. Those of us who are heirs to reservoirs of this description have often been discouraged after viewing, so far as they can be viewed, the old cribs and other assemblages of timber and brushwood which answered well enough for dams and spillways in their youth, but which come to us for our care and perpetuation in a decrepit state. A plan I followed in such a predicament may possibly be interesting.

At the outset I wish to disclaim having made any new discovery, although the scheme was new to me, and since having thought of this as a subject of a short paper, a limited research has failed to reveal its counterpart.

a curved neck joining it to the level pipe. The floods which have come since have flowed over the edges of the basin and converged into the neck smoothly. I should judge that the maximum head on the pipe had been about 8 ft.

As the waste weir stands at present, it seems to be efficient and permanent, and I certainly should not hesitate to adopt as an economical device a similar construction on a much larger scale. An earthen dam is in most cases a secure and imperishable dam if the waste weir does its work; and this kind of waste weir will do its work if properly proportioned. The force of the discharge is the only destructive agent present, and that can be spent on boulders remote from the foot of the dam.

Providence Passenger Station.

The Union passenger station at Providence, R. I., which was finished nearly a year ago, and which has remained vacant since then on account of a dispute between the railroad company and the officers of the city as to whether there should be a train shed, is now nearly ready for use, the train shed, which

line of the shed will be 640 ft. Of this length, for 360 ft. (in the center), the roof trusses are of a cantilever construction, having an unsupported bracket projection one side of column of 34 ft., forming an "umbrella" about 70 ft. wide, and leaving to be supported by the rear (northernmost) columns practically less than 10 ft. in width of roof. One of these trusses (Truss E) is shown in Fig. 5. Such an arrangement was feasible and desirable in this instance, as there was ample supporting strength in the underlying iron work of Francis Street Bridge (upon top of which this part of the train shed is built), where the "umbrella handle" comes, and not such ample supporting strength in the underlying work below the rear columns. These rear columns therefore render their most important service by giving lateral stability. Where the truss roof is broken off, at the junction with the existing roof of the concourse, there will be wooden construction, with the necessary windows to furnish light and shut out the rain. This junction of the two structures is indicated

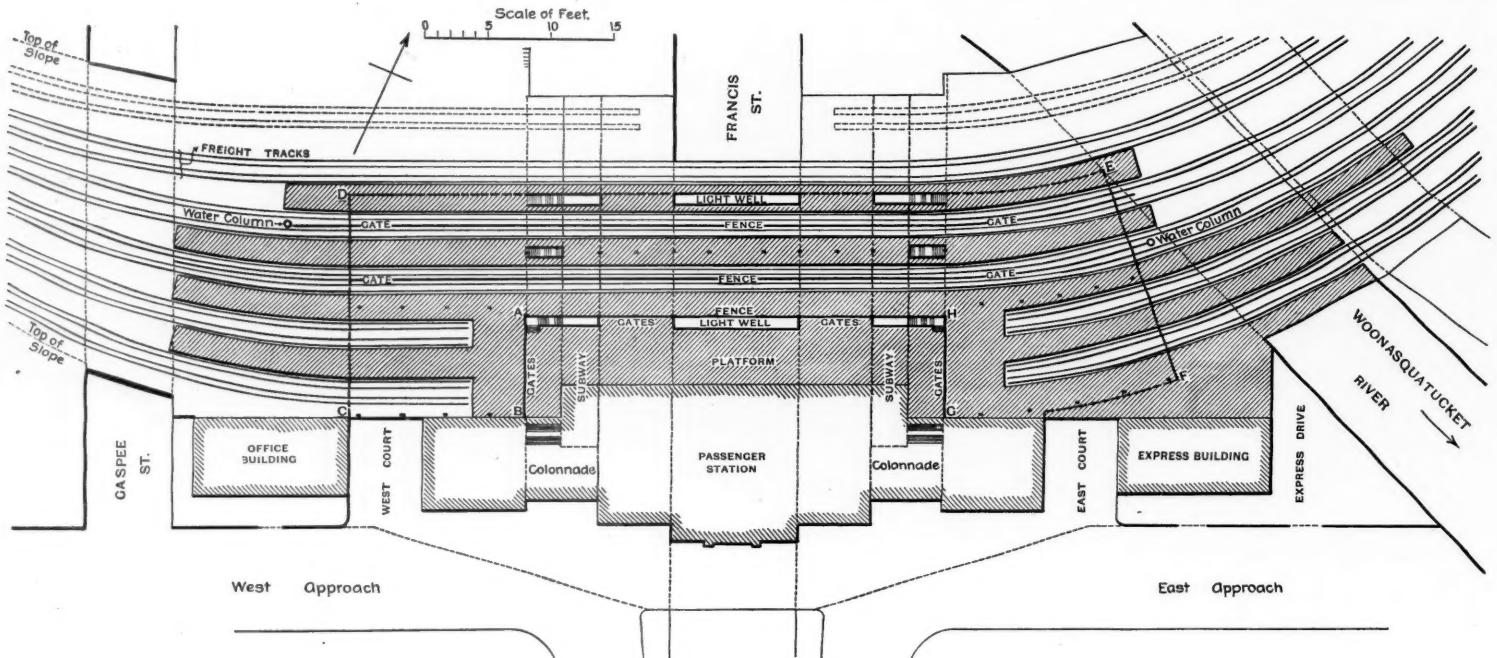


Fig. 1.—New Passenger Station and Train Shed, New York, New Haven & Hartford Railroad, Providence, R. I.

The dam setting back the waters of a small water-course at St. Thomas, Ont., making an artificial lake of about 14 acres, was about 16 ft. extreme height and 300 ft. in length. Near the center of the dam was a crib, at one time more or less filled with brush and clay and topped with a plank floor, over which the waste water ran in freshets. The side or end walls of the crib were extended above the level of the floor so as to give an available waste weir of 26 ft. by 2 ft. An apron supported on timbers conducted the waters to the old creek bottom. This flume had an inclination corresponding to the repose of the earth which constituted the remainder of the dam. The whole affair was old when I first saw it, and exposure to water and sun had cracked and decayed the timbers so that, in spite of the many battens on the floor of weir and apron, much water gurgled in the bowels of the crib. The timbers carrying the floor and presumably the lake were moss-grown. It was clearly a difficult matter to replace the structure in its original form, and I decided to cut loose from such ideas of waste weirs as I knew of and had seen, and to utilize the force of the flood in taking it beyond the dam.

I lowered the pond about 4 ft. by temporary means, which exposed the bottom for about 20 ft. inside the high water shore line. I sunk without difficulty on this exposed lake bed a cylindrical caisson 14 ft. in diameter, made of 3-in. plank 16 ft. long. I excavated the earth inside this caisson and built therein a basin out of concrete, cylindrical outside and in the form of a frustum of a cone inside. The bottom was 3 ft. thick. The lower inner diameter was 5 ft. and the upper inner diameter 10 ft. The walls reached within 2 ft. of the top of the dam. An iron pipe 36 in. in diameter was built into the side wall of the basin at the bottom of it, and led through the end of the dam to a discharge near the old creek bed below the dam. The pipe was caulked with lead and held together with rods. I removed all the timbers I could from the old waste weir, filled the hole with clay, and waited for the next storm. I used a 36-in. pipe, while a 30-in. under 12 ft. head would carry all the water which the old waste weir would accommodate. At last the rains descended and the floods came, and with them the farmers from far and near, who were eager to see the 26 by 2 camel go through the 36-in. needle's eye. That waste weir entertained the visitors with music and contortions beyond the wildest speculations of anybody. Its roarings could be heard for miles, and the alternate sucking down of the flood and vomiting of it forth were features in a waste weir too new to be entirely satisfactory. The pulsations of the discharge of course interfered seriously with its volume, although I think their violence would have abated had the storm raised the pond the other 10 in. there were to spare.

The waste weir was too much of a howling success to be proud of. The flat bottom of the basin clearly stopped the movement of the column of water until it could get a considerable head. Immediately after that first storm I filled the bottom and sides of the basin with concrete, and now it is funnel-shaped, with

was agreed upon by the contending parties several months ago, being now nearly finished. In the drawings shown herewith the principal features of this train shed are described.

The general plan of the station, as settled upon when work was begun, was shown in the Railroad Gazette of Sept. 22, 1893. Further descriptions of the station were published in the issues of July 12, 1895, and Oct. 1, 1897. The illustrations given with these articles, supplemented by Fig. 1, shown herewith, will give the reader an idea of the arrangement of the station as a whole.

When the station was finished in 1897 the only shelter on the track side of the building was a "concourse" or wide porch protecting the passenger entrances. This structure is left standing and the train shed is built around it. In Fig. 1 the outlines of the train shed are indicated by the letters A, B, C, D, E, F, G, H. The shed and concourse together cover an area of about 2.6 acres and the combined structure as a whole furnishes the same general facilities as are found in the usual large through stations, such as those at Buffalo, Columbus and Indianapolis.

There are four main through passenger tracks, with two fences separating those which are close together, and four stub tracks at each end. In addition to these one of the two freight tracks outside of the shed can be used for passenger service in case of necessity, there being a sheltered platform adjacent to it. The dotted lines farther north indicate locations provided for two additional through freight tracks, though these have not yet been built across Francis street. The foundations for the bridge across the street are, however, laid.

The end view of the train shed will show two roof spans of 87 ft. 9 in. each, or a total width of 175 ft. center to center of supporting columns, and a little less than 180 ft. extreme width. The least clear height above tracks will be 21 ft. The length on the center

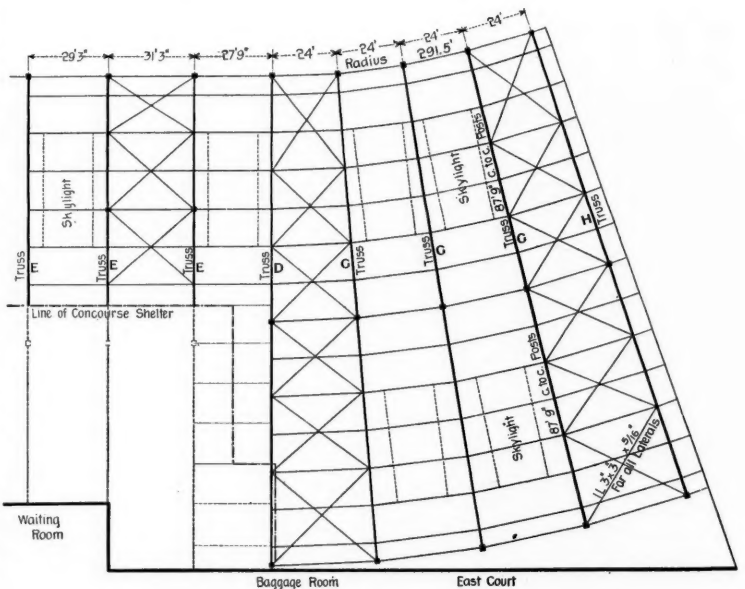


Fig. 2.—Part Plan of Providence Train Shed.

in Fig. 4, in which the observer stands east of the west line of the concourse, looking west. The wood construction will give an apparent, but not real, support to the ends of the cantilever trusses.

Light and ventilation are provided at the top of the main shed, both by a continuous lengthwise monitor along the crest line and by 13 cross monitors distributed over the roof. On the roof boards will be laid a first-class gravel roof with copper flashings, gutter strips, etc.

The combination of through and stub tracks, with two subways to allow safe passage beneath the through tracks, is expected to make this one of the safest large stations in use; and it will also be especially well fitted to handle large crowds of people with convenience and dispatch.

Fig. 2 is a part of the plan of the roof (at the eastern end) showing the arrangement of the trusses and the diagonal bracing. Fig. 3 shows two of these trusses in detail. Fig. 4 is a cross section at the westerly side of the concourse. Fig. 5 shows a cantilever truss, E, and Figs. 6 and 7 show examples of

*From a paper presented by Mr. A. Torrey, Chief Engineer Michigan Central RR., at a meeting of the Western Society of Engineers held Aug. 3.

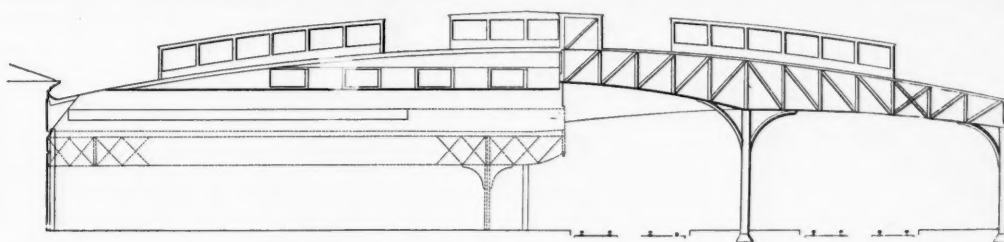


Fig. 4—Transverse Section Near West Side of Concourse.

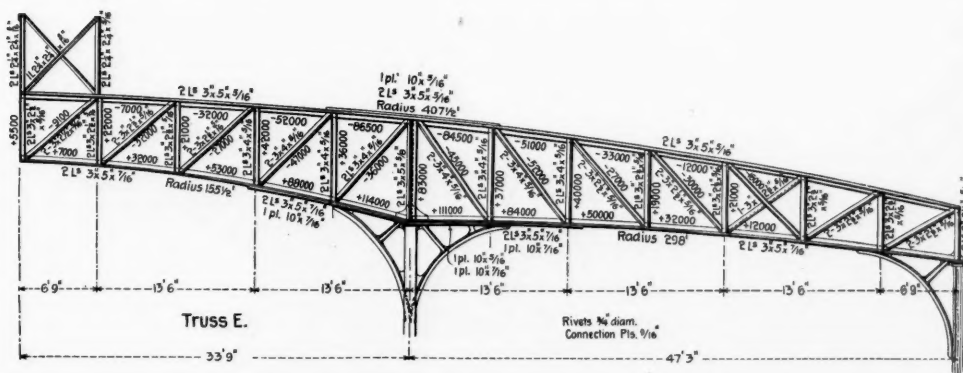


Fig. 5. —Cantilever Truss.

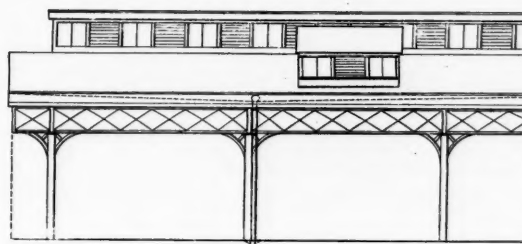


Fig. 6.—Part South Side Elevation—West End.

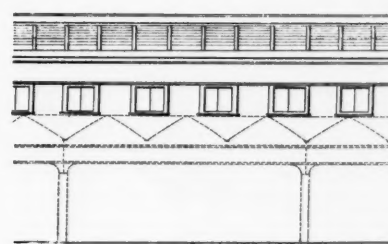


Fig. 7.—Part South Elevation—Center
The broken lines show the roof of the Concourse.

TRAIN SHED AT PROVIDENCE, R. I.—NEW YORK, NEW HAVEN & HARTFORD RAILROAD.

the south elevation. The north elevation at the west end is similar to that shown in Fig. 6.

The train shed, as well as the station and all the improvements, was designed by Mr. E. P. Dawley, Division Engineer of the New York, New Haven & Hartford, at Providence; and the contractors for the shed are Messrs. Hortons & Hemenway, the same who built the station.

Westinghouse Steam and Gas Engines and Generators.

At 1 o'clock on Saturday afternoon last week a special train of five cars carried about 300 engineers from Pittsburgh to East Pittsburgh, primarily to inspect some of the new engines and electrical apparatus made by the Westinghouse Electric & Manufacturing Co. and the Westinghouse Machine Co., which are about to be shipped to England, and incidentally to see the works, which are now working to full capacity in all the departments.

The buildings of the Westinghouse Electric & Manufacturing Co. were first visited, and among the other machinery which has been in process of building for some time were the large generators for the St. Lawrence Power Co., to be placed in the works at Messena, N. Y. As fully outlined in our issue of Aug. 13 last year, the plans provide for 15 complete independent equipments, including a 5,000 H. P. Westinghouse alternating-current generator for each. Some of these were in process of building, but the parts of one or two had been assembled, so that the successive steps in the work of building a generator of this size could be readily followed. In the electrical departments great activity was shown, the full quota of men being employed in each section, and a few of the departments are run day and night.

The machinery that is to be sent to the Metropolitan Electric Supply Co. of London was then looked into at the works of the machine company. This includes three 2,500 H. P. Westinghouse generators direct connected to compound engines, the design of which is somewhat different from any heretofore made. Some idea of the size of this machinery may be obtained from the following figures: The cylinders are 36 and 55 in. x 36 in. stroke. The combined weight of the machinery an dynamo is about 433 tons, and the engine part alone 210 tons. The weight of the pillow-block to the right of the engine, which supports the outer bearing, is about 10 tons. The weight of the dynamo is 213 tons, and the total weight of the revolving parts 35 tons. The main crank shaft is 14 in. in diameter, and the shaft at the armature 20 in. The total height is about 20 ft.

The main piston rod is about 8 in. in diameter. The diameter of the exhaust pipe is about 2 ft., and of the admission 14 in.

These engines are of the inclosed, vertical-compound marine type, and are the most powerful of any yet made at the Westinghouse Machine Works. They are not designed for very high pressures, but the novel arrangements of some of the parts, the uniformly excellent finish throughout and the fact that these are included in one of the large orders for complete machinery for the generation of electric power in another country make them worthy of thoughtful attention of both engineers and those interested in the exportation of American machinery.

One of the novel features in this engine is the arrangement of the bearings. These are divided into four parts, and wedge-shaped pieces are placed behind each, so that the wear can be taken up by turning a large screw placed conveniently near the bearings. The lower quarter of these bearings is made so that a stream of water can be passed through them. The lubrication is also an interesting feature. The oiling is supplied from a tank at the top of the engine, and its flow is regulated by levers on the first platform. The control of the admission steam can be governed from the first or the second platform. These platforms extend around the engine, giving access to all of its parts.

The electrical part of this machinery includes generators designed to give nominally an output of something over 2,000 H. P. at 500 volts pressure. These will be mounted on the engine shaft, but were not in place at the time of the visit. The completed engine and generator will be sent to England within a week, the other machinery to be sent as soon as completed, probably in a month or two. A direct current multipolar exciter is attached to each generator and arranged for direct connection to the engine shaft. This plant is to supply current for arc and incandescent lighting in London, and a part of the power is to be used for running rotary transformers, which in turn will supply current to direct current motors for charging storage batteries. The Metropolitan Electric Supply Co. is also planning new central stations and to remodel old ones.

Considerable interest was also shown in the 200 H. P. Parsons steam turbine, which was running at the time of the visit. This turbine is the first to be made in this country from the drawings of the machinery which has been so successfully applied to the launch "Turbina," and by means of which a speed of about 37½ miles an hour was attained* On one of

*See Railroad Gazette for May 7, 1897, p. 313.

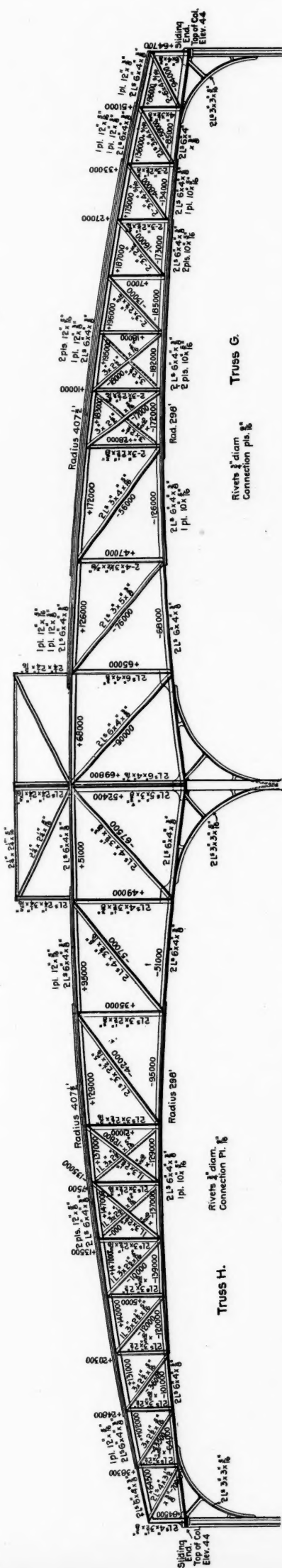


FIG. 3 -- Half Elevations of Trusses G and H, Providence Train Shed.

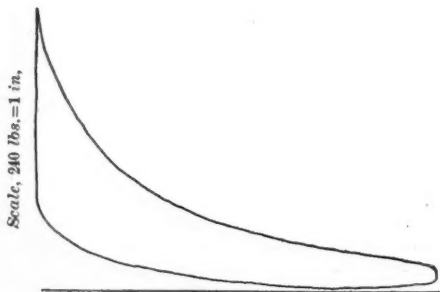
the preliminary trial trips the engine of this boat showed a steam consumption of 15.86 lbs. per I. H. P. per hour.

Last Saturday the turbine was running at 4,800 revolutions, driving a high tension generator placed on the main turbine shaft, giving a voltage of 900 and an amperage of 75. This voltage was reduced to 90 for use in driving machinery and lighting electric lamps. The engine consists essentially of (1) a barrel, in the internal bore of which are fitted numerous rows of steel blades; (2) a shaft which revolves within this barrel, having complementary blades fitted to the periphery.

By far the most interesting machinery to many was the gas engines, some of which were shown in parts, while others were direct connected to the dynamos, the power being used for electric lighting. In the engine room a 250 H. P. gas engine, which has been completed for some time, was seen, but was not running. The smaller engines, those from 50 to 60 H. P., which are worked on exactly the same principle and similarly designed throughout as the larger ones, afforded an opportunity of observing the perfect regulation of these engines. The 200 electric lights, power for which was obtained from a generator direct connected to a 65 H. P. engine, showed absolutely no variation in intensity, thus indicating that the engine was perfectly governed. With each of the gas engines is sent a small compressor which is belted to the main fly wheel of the engine, and used to store tanks of air for the purpose of starting the engine. For large sizes the tanks are sent to the user stored with sufficient pressure, so that the engine can be started easily and effectually.

A 650 H. P. engine (commonly known as the 750 horse) was running at the time, a prony brake being used to absorb the power. This engine was also designed to be direct connected with a generator of equal capacity, and the results of tests made upon the machine show that as perfect regulation can be effected in this as in smaller sizes. The gas, which forms about $\frac{1}{3}$ of the explosive mixture, is drawn into the cylinders with the air and exploded by means of an electric spark, the contact being broken at the instant of the explosion. In all the engines of the Westinghouse type an explosive mixture is admitted each revolution. The governor controls the amount of explosive mixture admitted. This departure from the more common "hit and miss" method is believed by some who have been influential in the design of this and other engines, to make it possible to regulate them better. The principal ingredient of the natural gas which is used at Pittsburgh is marsh gas ($C H_4$). With this gas about a thousand B. T. Us. per pound can be realized, and in using it one part of the gas is mixed with about 12 parts of air. A simple arrangement by which the proportion of gas and air can be changed as desired is placed near the gas inlet of the engine. By means of this simple device the engineer running the engine can easily determine the best proportion of mixture to be used.

There are no oil cups to lubricate the cylinders. The crank dashes the oil from a dash-pot, lubricating the principal moving parts. From results of tests it is found that about 13 lbs. of water are required per H. P. per hour to cool the cylinders.



Heavy Load Card from 25 x 30 in. Westinghouse Gas Engine.

The accompanying indicator diagram was taken on Monday of this week from this engine, the scale being 1 in. equals 240 lbs. The engine is designed to run at 145 revolutions per minute, the diameter of the cylinder being 25 in. and the stroke 30 in. Tests on this engine have shown that a brake horse-power can be obtained on 11 cubic ft. of natural gas. It is probable, however, that this low figure would not be guaranteed for anything but the very best conditions. Considering the machine as a whole, one was strongly impressed with its simplicity of design and its smoothness of running.

One of the commendable features of all of the engines that were running was the entire absence of any disagreeable odor, the only smell that was detected came from the burnt oil in the cylinder, but was not noticeable a few feet from the engine. When one stood on top of the 650 H. P. engine when it was running under load, the air was as pure and at nearly the same temperature as in other parts of the shop.

The Engineer and His Country.

We discover in the July issue of the "Stevens' Indicator," in the account of the doings of commencement week, an address to the graduating class, delivered by Mr. H. G. Prout. It expresses some notions of the relations of the engineer to society which may have a little interest to certain of our readers, especially to the younger engineers among them. Those who have read the speeches at the Endicott dinner of the Engineers' Club will discover that this Stevens address repeats some thoughts and even some sentences which are to be found in one of those earlier speeches. This is not exactly plagiarism, however, or even unconscious remembrance, but a deliberate appropriation, for which there seems to be good authority, for we are assured that:

"When 'Omer smote 'is bloomin' lyre,
He'd 'eard men sing by land an' sea;
An' what he thought 'e might require,
'E went and took—the same as me."

President Morton, Gentlemen of the Graduating Class, Ladies and Gentlemen:

At the outset I venture to congratulate you, sir (to President Morton) on the work that you are doing here. Year by year you send out a group of young men equipped with sound knowledge, and what is more important, equipped with the habit and power of work, and so you are laying the foundations of the enduring life of the nation.

Young men of the graduating class, I venture to congratulate you on your situation, standing as you do at the gateway of the noblest of the professions, full of hope and enthusiasm and young strength and energy and full, let us hope, of calculus and thermodynamics. It is a most enviable position and you ought to feel that you are among the chosen of the earth. I say the noblest of the professions, and here let me repeat old Tredgold's definition of engineering. Fix it in your memories and let it become a part of your mental stock. "Engineering," said Tredgold, "is directing the sources of power in nature to the use and convenience of man." That is the key to what I have to say and I hold that it applies to the moral forces as well as to the physical.

I have read somewhere that the chief obstacles to the progress of men are gravity, friction and natural depravity. The more you think about this statement the more complete it is. Voltaire said: "All general statements are untrue, and probably this one is also." At the bottom of this cynical witticism or witty cynicism is a certain truth, but we may take the general proposition with regard to the obstacles to human progress as fairly correct.

For some generations society has agreed to leave to the engineer the care of friction and gravity, but natural depravity has been left to ministers, lawyers, editors, teachers, the mothers of families, to anyone, in fact, but the engineer, and this is where society makes a mistake. The best corrector of human depravity is the engineer, because he must deal with conditions while others may deal with symptoms. The engineer must always square himself with the laws of nature, which are perfect, unchanging and eternal. So far as he fails to do this he falls in his business and misses his daily bread. Other men can square themselves with human laws and human notions of morality, and so they can twist along without ever knowing the difference between right and wrong. And that is why the engineer is the best moral guide. He must have a passion for truth and the faculty of thinking straight or he cannot succeed in his business. This is no mere extravagance of words to amuse you for the moment. It is a solemn truth.

We can all remember crises involving moral issues when great numbers of the clergy, perhaps the majority, were on the wrong side because of confusion of thought and false proportion. They have mistaken a conventionality for a moral truth. Or they have been mistaken in the relative value of two moral offenses. Or they have been led away by expediency—that most dangerous guide. Every day we see the talents and the energies of able lawyers bent to defeat justice and to shield crime, and this is defended by sophistries that have lived for centuries. You remember what Macaulay said about this: "We will not at present inquire whether it be right that a man should, with a wig on his head and a band round his neck, do for a guinea what without these appendages he would consider it wicked and infamous to do for an empire."

But, on the other hand, it is the good fortune of the engineer (and into that good fortune you young men have now entered) that sophistry and ignorance will surely kill him professionally and that his success will be in direct proportion to what he actually knows and to his determination and power to reason straight. If he does not know the stresses in his bridge or engine, if he does not know the endurance of his material, if he does not design his structure according to what he knows he cannot long pretend, even to himself, to be an engineer. Nature, calm and unrelenting, always stands looking at him. No other man in the world has such stern and unceasing discipline, and so it comes about that no other man is so safe a moral guide as the engineer, with

his passion for truth and his faculty of thinking straight. This is no mere statement of a theory, but of observed facts. It has happened to me, over and over again, to discover that I get a sounder opinion on any matter of human conduct from the engineers of my acquaintance than from men of any other calling; and this is chiefly because nature has taught them that their opinions are worthless unless they are severely reasoned from known facts. Other men, especially ministers and editors, get the dangerous trick of thinking that their opinions are valuable merely because they are their opinions.

Our country never needed the intellectual and moral influence of the engineer more than at this instant. I do not mean in his relation to gravity and friction, but to natural depravity. For more than a century we have been taught that human history began in 1776. We have been taught that a capacity to do things fell upon us like a mantle with the Declaration of Independence, that the American does not need to be trained or disciplined to rule a nation, command an army, edit a paper or preach the gospel. This gigantic self-conceit has its advantages. It has led us to do great things, but at an appalling cost in misplaced energy and wasted resources. This provincial conceit, born of ignorance and nursed by wrong teaching, is the greatest peril of the republic. If it is not restrained and cured it will ruin us.

The Kansas farmer sits on his fence and spits and thinks and produces a system of finance, and his neighbors gather around, ignorant that the same thing has been tried and failed over and over again in the last five thousand years, and they shout "behold the Kansas idea; behold the great American idea;" and they proceed to ruin the credit of the State, and one result is Bryanism. The son of the Kansas farmer reads what he is told is a scientific journal and he invents a perpetual motion machine which oxen could not move and enriches the patent agent. Three months with Denton would save the energies of that young man to the useful purpose of hoeing corn.

With the same light heart we insist upon war and we abuse the authorities because they try to keep peace. Weeks before war was declared the great powder makers of the country went to President McKinley to save the nation from the wretched situation of going to war without powder. I am told, indeed, by a high officer of the navy that just before war broke out we had not three rounds of powder for each gun afloat. Luckily, we were able to buy a thousand tons abroad and to land it in our ports. The Governor of a great State has telegraphed to the Secretary of War that he has the first battery of artillery ready and equipped for the front, except guns, horses, harness and uniforms. Surely the power that protects the feeble minded and the foolish has been with us in this emergency. Imagine our situation at this moment if Spain had a dozen more good war ships and if these happened to be commanded by bold and enterprising men. How should we stand before the nations of the world to-day with two or three of our great ports blockaded or laid under tribute and with our fleets manœuvring to get a chance to fight without the odds against them? But all this might have happened, and if our Venezuelan jingoes had had their way it would have happened a few years ago, only raised to the nth power; and yet in our ignorant conceit we go on blustering and blowing and talking about foreign empire and colonial expansion until, as Kipling says, "we wake the drumming guns that have no doubts."

It is probable that foreign empire and colonial extension are in store for us; that is no new idea, and the present war may have much or it may have little to do with its development. The underlying fact is that we belong to the race which constitutes only $\frac{1}{15}$ of all the people of the earth, but which owns $\frac{1}{3}$ of all the available land of the earth and governs almost $\frac{1}{2}$ of all the people of the earth. Please observe these wonderful figures. Our race, the English speaking race, which 300 years ago was almost confined to the British Islands and which is now only $\frac{1}{15}$ of the population of the earth, owns $\frac{1}{3}$ of the land suitable for habitation and governs almost $\frac{1}{2}$ of the human people. It is probably the destiny of our race to go on in its great career; probably the conquest of the earth is to be to the straight thinking race and to the mechanical race, and that means that it is to be the engineering race. This goes almost without saying and is one of the lessons of our little war. We shall realize as we have not realized before that victory is not merely a matter of buying fighting machines, but of working and maintaining them, and there the engineer comes in. But further, victory is for the people who can see things as they are, without illusions, who will not take phrases for facts, and there again the engineering quality comes in.

Finally, we shall realize that victory is organized only by years of careful training, by devotion to duty and by honor in places of trust, and there also the engineer comes in, for I know no other calling, excepting the army and the navy, where duty and personal honor so control men as in the calling of the engineer. I believe it is a fact that of all the disburser officers under the general Government the officers of the Corps of Engineers are the only ones

who are not required to give bonds, and it is a further fact that the whole history of that corps, which has disbursed many millions, has been almost absolutely without corrupt use of public funds. It is the peculiar lot of the professional man that he is always working for some one else. He takes the interests of his client in trust, and then the client's interests must be supreme. Hence, honor and duty must lie under the foundation of professional success. But I observe that honor and duty are so much a matter of course with engineers who have risen to influence in the profession, that they do not even talk about them. The loftiest standard of conduct is taken for granted by the reputable engineer. He has an inarticulate and unconscious devotion. So, if material empire is to come to those who think straight, who lead in mechanical arts, who have the highest standards of honor and duty, the engineer is bound to lead in the march of conquest.

Two great historical illustrations come to my mind of what I have been saying about the military triumph of the clear-headed nation. Many of you have read the wonderful story of the Armada in the June Century. You have seen there that it was not the elements that defeated Spain. The storms of the North Sea and the North Atlantic only finished the disaster which began when ignorance, superstition, sloth, vainglory and corruption in office came face to face with energy, technical skill and devotion to duty. The English beat the Spaniards because they had faster ships, heavier guns and better sailors, and they had these because they had diligently and faithfully used their natural gift of practical intelligence to direct the sources of power in nature to the use and convenience of man. The other great historical instance which I had in mind was the last war between France and Germany, when much the same conditions came face to face 300 years later; and still another instance has occurred in our present war, when that quiet, patient, highly trained gentleman, Dewey, took his fleet into Manila. It was the same old story over again. Strictly we cannot claim Admiral Dewey as an engineer; he is a line officer. But actually he is the product of exactly the engineer's training. His life has been spent in arduous study of the relations of physical forces. The Naval Academy, the Naval War College, the Naval Institute, the daily life of the officer, are all part of one great engineering school. The handling and care of ships and the use of great guns are now mechanical engineering; fleet tactics and grand strategy are problems of mechanical and civil engineering, involving the co-ordination of elements of power, speed and coal endurance.

But if the line claims Dewey the engineers claim Hobson. That young man is strictly and technically an engineer, and his glorious deed was engineering in action. Any lieutenant of cavalry could have stood on the bridge of the Merrimac while she went up the channel, but it took technical skill and disciplined intelligence to fit the torpedoes to the side of the ship, to guide her to her place, to swing her into position and anchor her there, and then to explode the torpedoes at the right instant. Mere courage would have bungled that job.

But if the conquest of the earth is to be to the mechanical people and to the straight thinking people and to the people with whom the sense of duty and honor is strongest it must be to our own English speaking race first and to our nearest kin, the Germans, next. In all these vital qualities we excel, and especially in our respect for truth, our sense of duty and of honor. It was once my fortune to command Orientals for some years, and I found but one man whom I thought I could trust, and I was never quite sure of him. When one of my Circassian officers had been especially trying I sent for him and said: "Achmed Effendi, in any other service you would be cashiered for lying." "Oh! Mon Colonel," he said, "you must not blame me for that; that is the way we are educated!" I am told that in the Arabic there is no word for honor as we use it. However that may be, it is, I believe, almost universally true that with the Oriental peoples and the Continental nations honor is a matter of vanity. With us it is a matter of noble pride. With them honor means that you must kill a man if he bites his thumb at you; with us it means that we must never do a mean thing.

Gentlemen, I close as I began, by congratulating you on entering a profession in which you can succeed only by the constant exercise of these noble qualities so singularly strong in our own race—love of truth, direct thinking, simplicity of purpose and devotion to an ideal duty. You are most fortunate in having chosen to live in an air so bracing. I hope it will agree with you. I remind you that you have the traditions of a great and noble profession to uphold, and beyond all that, that you owe to your country a solemn duty, the duty of leading your fellow men forward in the path of scientific and intellectual truth. When life seems dull and commonplace, when your back aches over the drawing board, when you are half roasted in the engine room, and the world seems to be inhabited mostly by wicked coal contractors and stupid firemen, stop and think that those are only little incidents. Remember what I have said to you to-night about the responsibilities

of your great profession and read McAndrews' hymn: "Lord, send a man like Robby Burns to sing the song o' steam. From coupler flange to spindle guide I see thy hand, oh God, Predestination in the stride o' yon connectin' rod, Now a'together see them lift their lesson—theirs and mine, Law, order, duty and restraint, obedience, discipline."

Gold's Improved Electric Heaters.

It is interesting to note the improvements made from time to time by the companies concerned in the development of electric heaters. In our issue of May 13 last we gave the latest improvements in the Gold heaters up to that time, the principal modification from previous designs being in the arrangement of the spiral coil and support. We show herewith a portion of the resistance coil and support as modified from the form shown in the issue referred to. The



Fig. 1.—Improved Resistance Coil and Support.

manner of winding the resistance on an open pitch, so that when it is placed on the rod the wire is in its natural position, has served so well that any change in this particular has been unnecessary. In the construction of the Gold improved heater the resistance coils are supported in such a way that the support itself, while holding the wire firmly in place, cannot vibrate. The new method is shown in Fig. 1, and as can be seen from the illustration, differs from other designs. This support consists of a one-quarter inch steel rod, which is thoroughly covered with an insulating enamel and which enamel is burned on the rod at a temperature of over 2,000 degs. It is, therefore, not affected by any heat to which it will be subjected, and at the same time is an excellent non-conductor. This rod is shaped in a zig-zag form, and the resistance coil when slipped on in place assumes the position shown in Fig. 1. Special attention has been given to the composition of the resistance wire used in these coils, and there has been combined a high resistance with absolute non-corrosive qualities. It has been tried under all sorts of conditions, and the company states that this wire has never been known to fail. In Fig. 2 is shown a plan of the

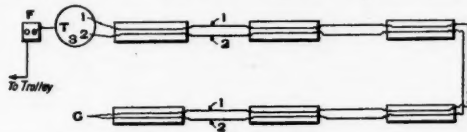


Fig. 2.—Method of Wiring for Six Heaters.

method of placing 6 heaters in a car arranged for 3 degrees of heat. In the first degree six coils are placed in series as shown, the current consumption amounting to 3 amperes. With the second degree two coils are placed in multiple series, the current used being 6 amperes, and in the third degree connections are made in the switch by means of which both sets of coils are placed in multiple, the current consumption being 9 amperes. The fuse box and ground connection are marked by F and G, respectively.

This modified construction, as noted above, is being used in all the heaters now being made by the company. The changes made have been in the line of simplifying the apparatus. As shown in Fig. 3, the

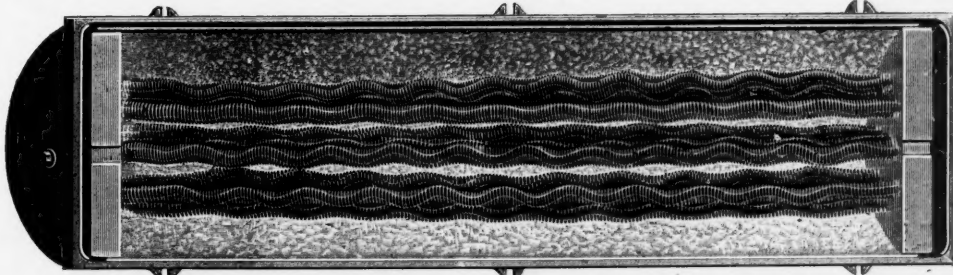


Fig. 3.—Interior of Gold's Improved Three-Degree Panel Electric Heater.

interior of this design of heater is lined with asbestos and has an air space provided at the top. The coils are so arranged that the upper sets are multiple and the lower sets in a single series. Six of these heaters are usually placed in a 24-ft. car, the gradations of heat being regulated by the three-point switch so common in many of the designs of electric heaters.

A circular letter relating to this modified form of heater, contains the following statement: "This heater is amply covered by patents granted and applications for patents pending and is not now and never has been the subject of any litigation or legal controversy."

Automatic Electric Signals on the Boston & Albany.

By Geo. W. Blodgett.

II.

When wire circuit signals were first used on the Boston & Albany they were arranged on what has been known as the duplex system. Each signal was provided with a "tell-tale," working in connection with it, whose normal position was always opposite to that of the block signal itself, and the only use of which was to indicate to the engineer whether or not the signal had worked for his train when he entered the block. This second signal was usually placed about 1,000 ft. ahead of the block signal and when that changed from clear to red, the tell-tale or "safety signal," as it was called, changed from blue to clear. Should it fail to do so, it indicated that the block signal had not changed—and therefore was out of order—and that the train should run with caution through the block, or until the way was known to be clear. The instruments of that time (as compared with those now in use) were exceedingly complicated. They were worked by an open circuit, and as the same battery was used for a section several miles long, it was necessary to provide means whereby, when a signal had made its movement, the current would be immediately cut off from it, so as to be available for use somewhere else. This was accomplished by an automatic battery cut-off attached to each signal, and operated by the signal itself when the current had performed its work.

The large amount of complicated machinery connected with automatic signals of that day, and their high cost, were the principal factors which prevented their more successful working and their more extended adoption. They, however, paved the way for better types, by demonstrating in actual service the limitations and imperfections of apparatus constructed upon the lines then believed to be most rational. In this way they were of great value, even in their imperfect state, but there were weak points which experience and subsequent inventions have largely or entirely removed. It is not important here to detail the successive steps in the development of the wire circuit system; it is sufficient to say that it has proceeded along the lines (1) of greater simplicity in the construction of the instruments, (2) relieving the circuit of needless complications, (3) isolating the signals as much as possible by making each independent of every other (although working in conjunction), so that a failure or break-down may affect only one or at most two signals. Formerly the failure of a single battery jar might disable several miles of signals on each track. The present plan also helps to locate and promptly relieve troubles when they occur. These old style signals were, however, in regular use for about 15 years and gave good service, but at somewhat excessive expense, and were subject (as may be supposed) to many more cases of failure than the simpler forms of to-day. They were much improved by a change in the instruments which was made in 1880, and in the circuit itself, which was changed to the present style in 1890, since which time failures and derangements have been very few compared with the preceding record.

The present types of instruments used are among the most perfectly adapted and most reliable pieces of apparatus which it has been the fortune of the writer ever to examine. He has had these and earlier forms under his constant observation for more than 15 years and knows that the number of cases of failure is surprisingly small. The cost of repairs has also been so diminished that it is now quite an insignificant item. The principal expense of maintenance is now the material used in the batteries, which cost on an average about one dollar per cell per year for material, and possibly as much more for labor. Counting 15 cells

for each signal (some require not many more than half this number), this item amounts to about \$15 per signal per year. The next greatest expense is the systematic cleaning of the track and switch instruments, which should be done say once a month, and which if regularly attended to keeps them in perfect order. Here, as in all other work connected with the maintenance of signals, an ounce of prevention is worth much more than a pound of cure.

These signals are of the disk pattern, enclosed in a wooden case, with round openings in the front and

(Continued on page 566.)

* For preceding article see July 22, page 530.



ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY,
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

The argument for the use of the wire circuit instead of the rail circuit, for automatic block signals, is set forth in another column of this paper by Mr. Blodgett. From his long experience and his judicial temperament Mr. Blodgett is unusually well qualified to form a discriminating judgment concerning the relative merits of different electric signals; but he hardly makes his argument strong enough. It seems to us that, looking to the future, the first one of his four reasons is more important than all the others combined. He seems not to attach sufficient importance to the universal use of the air brake, which will soon be an accomplished fact. With all freight cars air-braked we shall soon come to look upon the running of any train without that safeguard as about as bad as running without a hind-end man, or without red tail-lights at night. With the automatic brake connected through, we can say, for all practical purposes, that "a train [not very seldom, but] never breaks apart without the trouble being quickly discovered" and, we may add, without both parts being quickly stopped. We have nothing to say at this time in favor of wire circuits, beyond what Mr. Blodgett has said; but the wire circuit should have the full advantage of every circumstance that favors it. With all trains air-braked the one great objection to wire circuit signals is satisfactorily answered. While Mr. Blodgett's first point is thus very strong, we think that the other three are all chargeable with the weakness of depending too much on the law of chances. It is "unusual that a second train follows closely," but a block signal cannot fairly depend upon evading a duty because it will never chance to be called upon to perform it; it does not fulfill its functions unless it protects trains against unusual as well as usual movements of trains following behind. Again, taking "proper steps to protect the detached rear portion" of a train is an element that we cannot depend upon. The better your signals the more fully will trainmen depend on them, rules or no rules, and the fewer years will it take for them to get into the settled habit of not taking proper steps, or any effective steps, to protect the rear ends of their trains by flagging. The ideal signal takes no account of the flagman; and the experience of English roads with block-signaling would seem to teach that in this matter the ideal and the actual must be made to coincide.

Texas is apparently the most active in railroad building of any of the States. There are at present no less than 19 companies building roads. Prominent among these is the Pecos Valley & Northeastern, which is building an extension from Roswell, N. M., to Amarillo, Tex. Another company which has already completed the portion of its line through Texas is the El Paso & Northeastern, whose road is to run from El Paso northeast into New Mexico, 165

miles. The Gulf, Beaumont & Kansas City has been recently reincorporated as the Gulf, Beaumont & Great Northern, and proposes to extend its line north from Kirbyville about 150 miles to Jefferson. Work has been progressing steadily for some months on the Gulf, Brazos Valley & Pacific, which is projected to run from Henrietta south through Mineral Wells and down the Brazos River to Velasco, in all about 400 miles. A road on which work was recently begun is the Guadalupe Valley, which is to run from Victoria, Tex., east to Galveston, about 120 miles, besides a branch from Victoria north about 90 miles to Smithville. Another important project is the Colorado Valley from Sweetwater southeast toward San Antonio and Austin, about 250 miles. The Chicago, Rock Island & Texas extension of 28 miles from Bridgeport to Jacksboro is nearly completed, and is expected to be ready for the trains next month. Should all the roads be completed that are called for in these 19 projects—as they probably will not—Texas would be the richer by some 1,800 miles of road. Even at the present time the State is third in the number of miles of railroad as compared with other States, Illinois and Pennsylvania only having more mileage. On Jan. 1, 1897, Texas had 9,489 miles, and has since that time added about 160 miles, so that the present mileage is not far from 9,650 miles. While this is a larger mileage in proportion to the population than most of the neighboring States, it is much smaller in proportion to size, and Texas has room yet for large developments. In addition to the 19 roads under construction, there are 14 roads that have incorporated since the 1st of January, either in Texas or in neighboring States, to run into Texas, and there is an equal number of older projects which indicate more or less activity. Of course, it would be an easy matter to include the 2,500 miles called for by these 28 companies in the proposed mileage of the State, but the probabilities are that not one mile in a hundred will be built in the near future. Taking it altogether, however, Texas bids fair soon to take the first rank among the States in railroad mileage, and to include every mile of road that her present traffic or that of the near future will bear.

The "Cleveland" Locomotive Cylinder.

The daily press has lately found another scheme for running trains a hundred miles an hour, and this time the feat is to be accomplished by the "Cleveland" locomotive cylinders now on trial on the Intercolonial Railway of Canada. A description of this cylinder arrangement is given elsewhere in this issue, and its publication seems to be justified by the fact that a trial is actually in progress by an important railroad.

The device seems to consist of a long single expansion cylinder having a double piston and an auxiliary exhaust at the terminal stroke, making, in effect, two single acting steam cylinders on each side of the locomotive.

It is evident that the details of the arrangement shown are quite crude, but it is not fair to condemn the first design of any machine because of minor defects. We therefore asked a very experienced locomotive builder, whose opinions we greatly respect, whether the principle involved in this arrangement could, in the hands of a skillful designer, be applied in such a way as to be of practical use and an improvement over present practice. This is what he says:

"We cannot conceive that this cylinder arrangement could give results in service equal to the present locomotive practice for the following reasons:

"(1) It has twice the condensing surface of the ordinary locomotive cylinders.

"(2) The surfaces are exposed to the atmosphere for a long time.

"(3) There is a large increase in the weight of reciprocating parts.

"(4) The arrangement involves excessive weight on the engine truck, and in some types of locomotive, such as the eight-wheel and ten-wheel engines having a four-wheel truck, it would interfere with the design of the truck.

"(5) The arrangement is expensive to maintain, and unnecessary; it is likely to prove extravagant in the consumption of fuel.

"The above are our opinions; they are of course not based on results obtained in actual service. We learn that the engine which is on trial on the Intercolonial is said to use less fuel than the ordinary engine, but we have no knowledge of the fuel consumption of the ordinary locomotive with which comparison is made."

Quite likely this will be the opinion of most railroad men to whom this cylinder will be presented for trial. The inventors would do well to have some

expert engineer take indicator cards from the locomotive now in service; we are inclined to believe that such diagrams would go a long way toward settling the more important points which can now be only matters of opinion.

The Co-ordination of Investigation.

In recent years many clubs and societies have been organized among railroad officers for the interchange of ideas and general advancement in methods. Such organizations are very valuable, but, manifestly, the subjects treated of must be of general interest, and consideration cannot be given to questions which either because of their private nature cannot be presented or because of their local interest cannot be considered. Many of the large roads have organizations of their superintendents of the various departments and their assistants, and these can, and do, consider questions of more particular interest to the individual road. Even the latter organizations, however, are more or less cumbersome, and much information which is obtained at one station or division and which is of equal value to another station or division on the same road cannot be touched upon at the meetings of such organizations unless a longer time is given for them than seems generally allowable. There is, then, much that can be done beyond the field of these organizations, and this brings us to the thought which has led to the arranging of these ideas.

The investigation and tests made by one superintendent or master mechanic on a road may be just as interesting to another officer on the same road, and it may be just as important for the welfare of the road that officers other than those who are directly interested in making the investigations be advised of the results; therefore reports of investigations or tests should often be prepared carefully and completely and copies sent to the other officers who may be interested. We know of no road on which such a scheme is followed to any great extent, but the advantages would be many.

Under the methods generally followed tests of various substances or appliances may be repeated several times by different master mechanics or superintendents on the same road, whereas, were all divisions advised of the result of tests on one, the duplication would be avoided. Again, it frequently happens that the objects in view in making the tests or investigations are known to only those who are directly interested in making them, and in working up the data approximate calculations are made and conclusions hastily drawn which may or may not be correct. No record is made or the methods pursued or results obtained, and possibly the next officer in charge duplicates the investigation. Were it understood that a complete report should be made of all such work, giving the reasons for undertaking it, the methods pursued and the results obtained, and that the report would be distributed to all others interested, better work would be done, and the railroad company, as well as the individual officer, would enjoy the benefit. Such reports would of necessity be very complete, stating the conditions prevailing, the information obtained and the conclusions drawn; then, if the reports are distributed as suggested above, erroneous conclusions may be corrected by the light of information in possession of some one who gets a copy of the report. Another advantage would be that such thorough investigation and complete report would require that the man most competent to do the work be assigned to it, and the report would be more valuable on this account. This is where the assistance of the young man just out of college would give good return.

Frequently experimental work is done at the main shops, and the first inkling of the results that the master mechanics get is an order that hereafter something must be done so and so. Were the report of the investigation in the hands of the master mechanics, the instructions would be carried out more intelligently and the results would be more satisfactory. Frequently also it happens that information is obtained, not for the benefit of the company, but for personal use. There are, however, many roads which cannot consistently complain of this, inasmuch as they set the example by sending their officers and employees to meetings and conventions to get what information they can, but to give none.

Buckling of Trusses on Brooklyn Bridge.

On Friday evening of last week, while traffic on the New York & Brooklyn Bridge was very heavy, a sick horse blocked the electric cars on the south roadway about 500 ft. west of the Brooklyn tower. The cars

came to a standstill until the entire line from the New York end, according to statements of many, as far as the point to which we have referred, was one almost continuous line of cars, the regulation regarding the distance of 102 ft. between the cars being entirely disregarded. Before the cars were again under way, the four main trusses buckled slightly; but this resulted in no serious injury to the bridge or made it in any way dangerous for cars to cross.

There is little doubt in the minds of those who have examined into the matter, that the excessive heat had much to do with this action of the main trusses, but it also appears quite reasonable that the direct cause was due to overloading.

This occurrence has brought up many interesting and important points touching the question of bridge design. It will be remembered that the trusses for about 500 ft. each side of both the New York and the Brooklyn towers are designed to form a cantilever, the four main trusses in each case being continuous. The difference in height at the center of the main span, from the coldest day in winter to the warmest in summer, is believed to be about 40 in. The slip joints are designed to take up the differences in the length of the bridge, due to its rising and falling, as well as to expansion and contraction in the trusses. Whether the extra loading and the excessive heat made it impossible for the slip joints to fulfill the purpose for which they were designed, thus producing too great compression, one cannot tell, but aside from this sufficient explanation of the cause of the buckling can probably be found in the excessive compression, due to the manner of suspension of that portion which forms the cantilever.

It will be of interest to determine from the investigation what tension is thrown on the land stays when the bridge is heavily loaded. Ordinarily, the stays which hold a part of the weight of this portion at the point where the trouble occurred, are supposed to carry 15 tons, but are sufficiently strong to sustain more than five times that tension. If the bridge was unevenly loaded, as it was reported to have been, and if the land stays were under great tension, the matter is easily explained.

As a remedy for the conditions as at present existing it has been suggested that the portion which now forms the cantilever be made entirely independent, so that the entire bridge will be entirely a suspended structure throughout. This would conform to recent designs of some of the eminent bridge engineers of to-day. For the present the regulation requiring the trolley cars to run at a distance of not less than 102 ft. apart and at a rate not greater than seven miles an hour should be rigidly enforced, although since Friday there has, apparently, been no effort on the part of the electric companies to enforce the first-mentioned rule. The whole subject is one of great interest to the engineer, and while the assurances of those in authority should dispel any fear from a repetition of the accident, yet no chances should be taken, and the subject should receive careful investigation by men capable of drawing really valuable conclusions.

The Russian statistical office has published a preliminary report of the traffic movement of 1897, from which it appears that there were 27,005 miles of railroad in operation at the close of the year, against 25,975 at its beginning. The quantities of the principal freights carried on them were, in tons of 2,000 lbs.:

	1897.	1896.
Grain to the frontier.....	5,257,332	6,302,016
Coal	7,529,400	6,565,456
Petroleum and its products.....	3,413,503	3,084,120
Salt	925,020	871,056

The grain shipments alone are what would be called large in this country, being last year equivalent to the weight of 175,000,000 bushels of wheat, which was one-sixth less than the year before. This, be it remembered, was nearly all export grain, St. Petersburg and Odessa alone, of the frontier towns, being large consumers. The coal movement for a country so enormous and so populous, seems trifling. The petroleum shipments were nearly one-ninth greater in 1897 than in 1896. This was largely due to low water in the Volga, which reduced the water shipments. About one-third of the grain carried by rail to the frontier was wheat, and about one-tenth was rye. Besides these rail shipments, 2,290,382 tons of grain were carried to the frontier by water routes, which was a little more than in 1896.

A complaint has been made to the British Board of Trade that ocean transportation to China is cheaper from the United States than from England. At the request of the Board of Trade an investigation was made by the Liverpool Steamship Owners' Association, and it appears that the trouble arises largely from the excessive cheapness of railroad transportation in America. Certain shipments were sent from Atlantic ports of the United States to Liverpool and thence to China, and were carried through at a price less than that charged for goods shipped at Liverpool, but on request this low rate from America was withdrawn. It would appear, however, that the English shipper is no better off than before, for the goods are now sent by rail westward from New York, and it is stated that the railroad

companies, both to San Francisco and Vancouver, ask no more for carrying goods through to Hong Kong than they do to San Francisco or Vancouver.

Reports from the West indicate that the roads between the Missouri River and Chicago have reached an agreement as to percentages for a distribution of packing house product and live stock, and if the scheme works they say it may be extended to cover other commodities. It will probably work all right until some line wants a settlement.

NEW PUBLICATIONS.

Department of Labor, Bulletin No. 17, Washington, July, 1898.—The July issue of the Bulletin of the Department of Labor, just issued from the Government Printing Office, contains an article on Brotherhood Relief and Insurance of Railroad Employees, by Prof. Emory R. Johnson, of the University of Pennsylvania, the same author who prepared a report in a former Bulletin (January, 1897), on relief departments managed by railroad companies. The present paper gives a carefully written history of the principal railroad employees' brotherhoods, with the best available statistics, apparently official in every case, showing their membership and their standing generally. Statistics are given of the operations of the relief, insurance and beneficiary departments of the brotherhoods for from three to twelve years, and altogether this paper evidently is the best compendium of information, on the subject treated, that has ever been published. The author makes a discriminating comparison between the work of insurance departments managed by the employees themselves and those managed by the railroad companies. Prof. Johnson writes in a tone of friendliness to the brotherhoods, and evidently with a purpose to be strictly impartial. He says little or nothing about the weaknesses of the brotherhoods, but in view of the apparently increasing conservatism of their management during the past few years, perhaps this is no more than fair. When speaking of federation Prof. Johnson appears not to appreciate the decided difference between the engineers' brotherhood and all the other organizations. He mentions that the enginemen voted not to federate, but does not tell the reason why, nor explain the significant social and business considerations bearing on the question.

This bulletin also contains a paper on economic aspects of the liquor problem, evidently by the editor, Carroll D. Wright, in which are gathered a large number of answers from employers as to the use of intoxicants by their employees. Inquiries were sent to over 7,000 establishments, among which were 729 classed under "transportation," this evidently including some steamboat lines as well as railroads. From the statistics given it appears that nearly all transportation concerns reporting make some sort of inquiry as to the drinking habits of an applicant for employment, but in 24 cases it is said that the liquor habit is not taken into consideration. Of the 729 no less than 138 report that they make no requirement that employees shall not use intoxicating liquors; 167 forbid the use of liquor on duty; 203 forbid it both on and off duty; and certain other roads, in about the same proportion, apply these prohibitions to certain classes of their employees, but not to all. Inquiry was made if employees subject to night work were more addicted to the use of intoxicants than others, but the great majority reported that there was no difference. Inquiry was made also whether men subject to exposure to severe weather are more addicted to drink; under this head 68 transportation companies answered in the affirmative, 415 in the negative, and 222 stated that they had no employees subject to exposure to severe weather.

Mechanical Draft for Steam Boilers.—The lecture by Mr. Walter B. Snow, of Jamaica Plain Station, Boston, Mass., before Sibley College, on April 22 last, has been reprinted from the Sibley Journal of Engineering in pamphlet form. The discussion in this lecture covers in a broad and careful way the present applications of mechanical draft with notes on its economy. According to Mr. Snow's statements, mechanical draft presents a three-fold opportunity for increased economy in steam production. First, in the reduction of avoidable losses; second, in a decrease in the first cost and resultant fixed charges on the entire generating plant, and third, in a reduction of the operating expenses, chiefly the fuel. Figures are given showing that a plant costing \$58,300 and designed to generate 16,000 H. P., effected a saving by using mechanical draft of \$5,800. The amounts making up this total saving in the different items are given. A careful examination of the facts stated in this paper leads the reader to be strongly impressed with the advantages, both financial and mechanical, of forced and vacuum draft. Mr. Snow has some extra copies of this lecture, which will be sent free by writing to him at the address given above. We have secured Mr. Snow to write an article for us to appear in our issue of Sept. 2, stating the advantages and economy of mechanical draft in central station work, with special reference to electric railroad plants.

History of the Railroads of the Austro-Hungarian Monarchy, published by the Austrian Railroad Union. Third volume.

This portion of this practical work contains in the first place a valuable treatise on the "mechanics of traffic," from the pen of the Inspector General of the Austrian railroads, Gustav Gerstel. Although this work, in its historical part, deals with the Austrian Empire, yet one who wishes to be familiar with the subject in general can by no means afford to neglect this important volume. The second part of the volume deals with signal and telegraph matters, and has for its author the distinguished engineer, Ludwig Kohlfürst. This will awaken wide interest. In a readable way, always dependent upon historical material, we are made acquainted with the purpose, nature and means of the different systems of signaling, and the different forms of apparatus, which are so arranged as easily to lead to a correct understanding of these matters and their different relations.

Universal Directory of Railway Officials. Published by the Directory Publishing Co., Ltd., 8 Catherine street, Strand, London, E. C. England. United States, E. A. Simmons, 717 Chauncey street, Brooklyn, N. Y. 8vo.; pages 475. Price \$2.50.

The fourth (1898) edition of the Universal Directory of Railway Officials has just been issued. It was compiled from official sources by S. Richardson Blundstone, editor of the Railway Engineer of London. Exclusive of advertisements, the book has been enlarged by 40 pages, the additions being distributed over the various countries. The names of the staffs of some of the important foreign railroads have been amplified, particularly in the case of the Turkish railroads; many new lines have been added, particularly from Denmark, China, Nicaragua and the Soudan; also light railroads of the European countries. Twenty-five pages have been added to the directory section and a personal index, which is proportionately larger, has been revised with great care.

Journal of the Worcester Polytechnic Institute.—The May issue of this journal contains an article on "The Theory of the Polar Planimeter," by A. D. Risteen; "Twenty-two Years Where Dynamite is Made," by R. S. Penniman; "Fire Protection Engineering," by H. L. Phillips, and "History and Development of Triangulation in Massachusetts," by Arthur D. Butterfield. A number of interesting engineering notes are also given. The Journal is published bi-monthly by the Worcester Polytechnic Institute, single copies of which can be secured for 25 cents; the yearly subscription is \$1.

TRADE CATALOGUES.

Electricity for Machine Driving.—We have received from the Westinghouse Electric & Mfg. Co., Pittsburgh, Pa. (and various other cities), a pretty pamphlet, advertising the use of electricity for machine driving. The text is an argument for using electricity instead of other forms of transmission. A good many statements and some figures, with which many of our readers are familiar, will be found in the text. The engravings, which are beautiful, show exterior views of several machines, as, for instance, a 1,000 H. P. two-phase generator, a Tesla polyphase motor, a mining pump driven by a Tesla motor, and shears, cranes, slotting machines, etc., electrically driven.

In the interest of good taste and good English we venture to suggest to the editor that he quit trying to be elegant, and that he aim simply and humbly to write straight English. In his preface, which he calls a "foreword," he speaks of compiling this "brochure," by which we suppose he means a pamphlet, although that is uncertain. He assumes that manufacturers will not object to spending the time necessary "to carefully peruse" his pages, by which we suppose he means to read them. Coming from the sophomore class of a young ladies' seminary these mincing affectations would not be quite so disagreeable as they are in a plain business pamphlet.

Metropolitan Locomotive Injectors.—The Hayden & Derby Mfg. Co., 111 Liberty St., New York City, sends an 1898 catalogue of locomotive injectors and general jet apparatus. This shows the Metropolitan 1898 injector, which is a double-tube injector, designed to secure the greatest possible range, to be easily repaired and not to be affected by the breaking or failure of valves in the pipe. This injector will start with 30 to 35 lbs. steam pressure and without any adjustment will work up to 300 lbs. A radical departure has been made in the check valve. This is an upright valve, large and extra heavy, giving full opening. It is well shown and described in the catalogue, as are all the details of the injector. Other special apparatus is also included in the illustrated descriptions.

The Baldwin Locomotive Works, in a 6x9 in. pamphlet, dated July, 1898, issues illustrated descriptions of the 10-wheeled locomotive built for the Kansas City, Pittsburgh & Gulf, the electric mining locomotive for the Stevens Coal Co., the Atlantic type built for the Wabash, and the rack locomotive for the Leopoldina Railroad of Brazil, illustrated in our issue

of Feb. 25 last; the "American" type, built for the Philadelphia & Reading, and the mining locomotive for the Southwest Virginia Improvement Co. The general dimensions of these and a number of other locomotives of recent construction, many of which have been described in detail in the Railroad Gazette, are fully given. This is one of a series of pamphlets entitled "Record of Recent Construction."

Automatic Electric Signals on the Boston & Albany.

(Continued from page 563)

in the back, which are covered with glass. The safety or "all clear" signal by day is shown by the white background behind the signal (outside the glass), and the absence of this is to be taken to mean danger, hence it is not very important whether or not the danger signal (which is a red disk), can be seen a long distance; but as a matter of fact the danger signal can be seen a great way off. It has been supposed that an enclosed signal such as this would be indistinct under certain conditions, due to reflection from the front of the glass, or other causes, but this has never given any trouble, and the writer does not recall a single case where the signal was obscured or its interpretation uncertain from this cause.

The old style of signals were provided with a white light at night for the all clear signal, before which the red disk appeared for the danger signal; the new ones have a red and a green lens for night use, showing at an opening above the disk, and in this respect leave nothing to be desired.

While it may be true that in certain localities a semaphore could be seen further than that particular disk signal, in most cases this is of no special importance, as the disk can be seen a much longer distance than is necessary to stop a train. If a train can be brought easily and safely to rest in a

and uncertainties in the use of the rail circuit are so great that the signals are not reliable.

Rail circuit signals were first introduced on the Boston & Albany in 1882 at three important stations on the second division to cover outlying switches and trains standing at the station, the first order being for six signals only. They were of the clock-work pattern and are still in use, some parts having been renewed since that time. By the arrangement of circuits then adopted, the signal batteries were placed at the stations and the current carried to the signal by line wires. This arrangement did not prove satisfactory, being more complicated and more costly than was necessary, and the circuit was changed the next year. Under the new plan the signal batteries were located at the beginning of the block near the signal, which was controlled by a relay connected to the rails at that end of the block. The battery which feeds it is located at the other end.

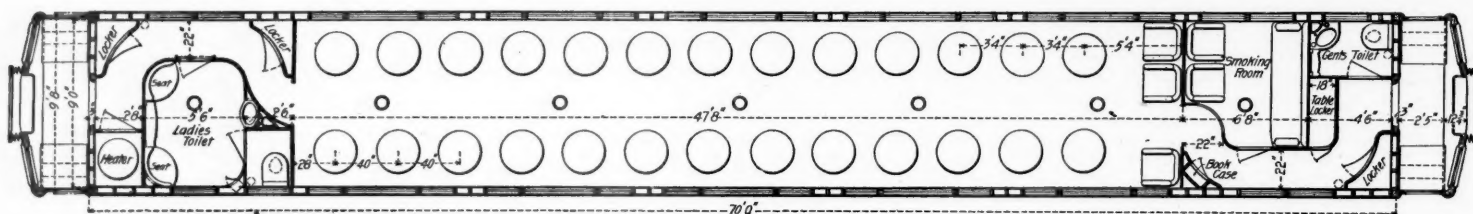
A year's experience with these signals showed that the idea of using a current through the rails to control the position of a block signal was a good one, and most of the remaining stations on the same division were furnished with a similar signal each side of the station during the next year, since which time the system has been gradually extended until the larger part of the road is now equipped with rail circuit signals, in station blocks or short sections of continuous signals, or a series of overlapping blocks extending for many miles. In the early installations the signals were contracted for to be furnished in complete working order, but for the last 10 years the railroad company has (with one exception) done its own construction work on automatic signals. It is believed that better work in some respects is thereby obtained, and that there is more attention to details. Any desired changes or modifications can be made without going outside the limits of a contract, thereby entailing extra expense. In the beginning the

In this rule the code uses the word "register," and it implies that a correct record must be kept over the personal signature of each conductor and engineman of the condition of his watch. In practice it is the rule to use a book known as a conductor's train register, and in some cases, with a view to convenience, the watch register is combined with the train register. In my opinion they should be separate.

The train register, as a rule, is very much neglected by officers and employees. One would think that an appliance like this, that has so much to do with the safe operation of a railway, should be accurate, legible and complete, consistent with brevity, that it should be kept clean and carefully checked (the same as a standard train order), but instead of this it is almost invariably illegible, dirty and crumpled. It frequently contains information that is of no practical use. In most cases the register is ignored by the operator or other custodian, and finally, when the book is filled (and they are rarely filled because the ordinary book will not stand such abuse), it is not always filed away as other important records are and should be.

As an example of the neglect of train registers, on an important trunk line recently I noticed a register which had printed at the top of the page the following: "Conductors will in all cases register herein in ink." An examination of the book failed to disclose a particle of ink having been used. On this same register, under the heading, "Cause of Delay," appeared some numbers, which the operator explained were the numbers of the cabooses. On another road an accident occurred on account of an engineman of a light engine failing to properly interpret the register. In this particular case both north and southbound trains were registered on the same page, although printed heading required separate pages to be used. Since this accident two books have been substituted for one, one each for north and southbound trains. On another road a bad accident, causing serious personal injury, occurred last year, which was attributable, in a measure, to the failure of inferior class train conductor and engineman to consult and properly read the register. On a leading Southern road I saw a train register very imperfectly filled out.

I fear that the supervision of train registers by superintendents and their assistants is very lax. It is not conducive to good discipline to require conductors to fill up a form of register that is in any par-



Pullman Parlor Car for the Baltimore & Ohio.

distance of a quarter of a mile, there is no particular advantage in being able to see a signal 6,000 ft., as the brakes would not be applied at that point; it is, however, of the utmost importance that its indication at the point where the brakes should go on should be clear and unmistakable, and so far as the writer knows there never has been any deficiency in this direction. The disks should be renewed occasionally, as the sunlight fades them somewhat.

There are two possible sources of danger to a railroad train, against which no track instrument signal pretends to provide, viz.: a broken rail (about which I shall have something to say in connection with rail circuit signals) and the breaking apart of a train in the block. This last is a possible source of danger, but it is not a probable one, for several reasons.

(1) A train very seldom breaks apart without being quickly discovered, when proper steps can be taken to protect the rear portion.

(2) It is unusual that another train is following so closely as to cause a collision before means could be taken to prevent it.

(3) Even if the signal be reversed by the forward part of the train running out of the block, it will, in the wire circuit system which I have described, be put to danger again by the forward part when it returns for the rear portion, or by the rear part itself when it reaches the next track instrument.

(4) A most potent reason why the writer believes that the danger from this source has been much over-estimated, is that there appears to have been very few accidents from this cause, and almost no severe ones. Had the risk been as great as many seem to believe it to be there must have been many cases of collision under these circumstances, but the writer recalls only a single instance where an accident happened in this way, while he does know of cases where the signal has been temporarily reversed behind a portion of the train left in the block. It is fair to say, however, that in the case where an accident resulted the signals were not of the improved type now in use, or furnished with the safeguards now considered necessary; and it is quite within the bounds of probability that had the system been put in as would now be done there would have been no collision. It is, however, always possible with wire circuit signals that a combination of circumstances which might not occur again for many years may happen, and the signal be reversed by the forward part of the train, and sound judgment dictates that we provide against all possible forms of danger, as well as guard against those that are known to have happened. Where rail circuits can be used there is in most cases no sufficient reason for putting in a track instrument system. The proper field for the application of the latter is where the difficulties

rails were bonded with two No. 9 wires wrapped around a rivet $\frac{1}{4}$ in. in diameter, and the whole galvanized together to make a firm connection and preserve it from rust. These wires were placed one each side of the rail, and driven through the flange, but since the Quincy accident, in 1890, where a train was derailed by a jack left standing upright at the side of the rail, it has been considered unsafe to drill the rails through the flange, as the machine must be fastened in an upright position, and there is a possible chance of derailment should a careless man leave it clamped on the rail when a train passes. It is now the practice to drill the rails through the web, and this has been found to work very satisfactorily if properly done; but there is no part of the construction work which needs more care than the wiring of the track. Some use has been made of channel pins and a detached galvanized wire, but it is more difficult to get durable work than with a standard track wire, except that they may be placed behind the fish plates at the joint, and are then more secure from damage by trackmen and others than when driven through the flange of the rail.

New Pullman Parlor Cars.

Pullman's Palace Car Co. has lately placed on the Baltimore & Ohio, between Washington and New York, a number of new parlor cars which have unusually large ladies' toilet rooms. The floor plan of one of these cars is shown in the accompanying engraving. The retiring room is about $5\frac{1}{2}$ ft. x 7 ft. and is luxuriously fitted up.

The interior of this car is finished in vermillion wood, handsomely carved and brilliantly polished, and is ornamented with delicate inlaid marquetry in Persian design. The deck is of the Empire design, and is ornamented to harmonize with the inlaid work. The chairs are upholstered with tapestry specially imported for use in these cars, and the floors are carpeted throughout with plain velvet in appropriate colors. The general effect is pleasing in form, color and general design.

Train Registers.*

Rule 395 of the Standard Code is as follows:

"A train must not leave its initial station on any division, a junction, or pass from double to single track until it is ascertained that all trains due which have the right of track over it have arrived or left." The Standard Code does not prescribe the means by which this information is to be ascertained. Rule 317 requires each conductor and engineman to compare his watch with the designated standard clock before starting on each trip, and register his name, etc.

*From a paper by T. F. Whittelsey, General Superintendent Toledo & Ohio Central; read before the Central Association of Railroad Officers, July, 1898.

ticular unnecessary. Conductors generally know whether the information given is used or not, and if unnecessary it creates a disregard which has a tendency to result seriously. The conductor's train register, as now maintained, is a positive source of danger. A conductor's train register should be used only in connection with Rule 395. It should be for the single purpose of enabling conductors to ascertain whether all trains due which have the right of track have arrived or left. In the spirit of Rule 450, "they must not contain information not essentially a part of them. They must be clear, and there must be no erasures, alterations or interlineations."

It is a question whether it is not good practice to require the operator, or other employee on duty, to be instructed to register the above information. Passenger trains which do not stop at registering stations are permitted on many roads to throw off register slips, and the operator, or other person, makes the entries. Is it not feasible to extend this practice to cover all trains? This would insure an accurate, legible and clean record, provided the information was correctly transferred from the slip to the register. I believe the time will come when there will be made a device, after the plan of a typewriting machine, a cash register or a sales register, by which a conductor, by pressing certain buttons or keys, can correctly record his train by use of characters so plain that "he who runs may read" and read unmistakably. Such a device could be made to post the information behind glass beyond any tampering; also the keys could be so interlocked that it would be impossible to correct an entry without calling the attention of the operator to the fact that correction was necessary.

The writer placed himself in communication with 24 roads, members of this Association, to ascertain the form of conductor's train register and register slips. Of these roads only seven have printed instructions on the register. They all have a column showing the train number, but only 14 provide a column for section number of train; three do not provide a column for showing the color of signals carried; four do not show from and to what stations signals are carried; four do not show time departed; two do not show engineman, while but one road shows baggage man and brakeman. One road has a column for tonnage; nine roads combine with conductor's train register a watch register; three require cabooses registered; two have a column for direction and one for division, implying necessity for more than one register. Seven have columns headed "Remarks," of which four permit any kind of notation; two allow for signals carried only; two include with signals cause of detentions, cause of delay, etc.

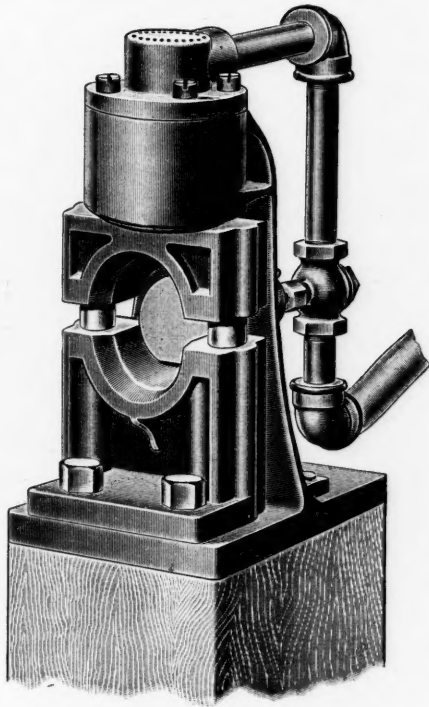
On the roads with which the writer is connected the conductor [examining the register] fills out a blank form, showing what trains having right of track over his train have arrived and departed. This he signs and hands to the engineman, who does not accept the same unless it is properly filled out. . . .

The Whomes Pneumatic Flue Reducer.

We take pleasure in showing another of the many ingenious and useful pneumatic tools which the Chicago Pneumatic Tool Co. has put on the market within recent years. The great progress lately made in this line of tools is due to the enterprise of this com-

pany more than to any other one concern, more perhaps than to all other concerns put together which have entered this field.

The tool now shown, known as the Whomes pneumatic flue reducer, is an automatic machine which starts when the flue is put under the dies and stops instantly on its withdrawal, so wasting no power. The output of this tool is limited only by the capacity of the furnace and the dexterity of the operator, and indeed 300 flues in an hour can be easily reduced with one of these machines. The tool is adjustable to flues from 2 in. to 2½ in. in diameter, only a few minutes being needed to change the dies. It is very convenient in size, being only 5½ in. x 7



The Whomes Pneumatic Flue Reducer.

in. base and 10½ in. high, and so can be placed conveniently for the operator. Furthermore, it is cheap, simple and durable.

The reducer will take the flues from the welding machine and reduce them at the same heat, so saving reheating them and handling them a second time; and it is especially useful in connection with the Hartz machine, reducing the flues as they are welded, adding no time to the operation and saving from three to five hours in every set of flues handled. Undoubtedly this tool will at once attract the attention of mechanical officers in charge of railroad shops.

A Bit of Difficult Location.

The accompanying plan shows a section of location embracing many difficulties, now overcome, which were encountered in carrying the line of the Antioquia Railroad over the central range of the Andes Mountains from the valley of the Rio Nus to that of the Rio Porse. The Antioquia Railroad is intended to connect the fluvial port, Puerto Berrio, on the west bank of the Magdalena River, 500 miles above its mouth, with the City of Medellin, capital of the Department of Antioquia, Republic of Colombia, South America.

The railroad was commenced in 1873 by Francisco J. Cisneros, a civil engineer of marked ability, who had a contract with the Departmental Government for its construction, and who began work on the banks of the Magdalena River, where Puerto Berrio now stands, having all around him deep, unbroken forests. For 100 miles ahead of him there were like forests, deep morasses of the Magdalena Valley, narrow canyons of the smaller streams and the formidable mountains of the Great Central Cordillera. Against these difficulties he struggled until 1885, having succeeded in building 46 kilometers of road to the divide between the waters of Sabaletas Creek and the Rio Nus, at Pavas, when the government settled its contract and relieved him of his burdens; though only partially, for it left him with an expenditure in excess of payments. From 1885 until 1894 the Departmental Government endeavored to carry on the work by direct governmental control, but failed to make any advancement, having made, broken and cancelled several contracts for the construction of the railroad. In the latter year the Departmental Legislature took matters in hand and created a commission called the "Junta Directiva," composed of private citizens, but of which the Governor is ex-officio President or chairman.

By the spring of 1896 this commission had completed 4.6 kilometers of road from Pavas to Monos, on the banks of the Rio Nus. At that time, through the New York agents of the Department, Messrs. M. Camacho, Roldan and Van Sickel, Mr. E. F. Whittekin, of Tionesta, Pa., was engaged to take charge of the road

as chief engineer and technical director. Under his direction construction has advanced as rapidly as the resources of the Department would permit, and the locating surveys are carried ahead far in advance of the construction, from Monos to the Andean Divide, known as "La Quiebra," a distance of 72 kilometers (45 miles). The first 20 kilometers traverse the narrow, steep, crooked, rugged, densely jungled canyon of the Rio Nus, presenting difficulties of no mean order. Then follow 35 kilometers of more open level country, requiring but little of skilled engineers in location. But from kilometer 108 to the summit there are difficulties enough for the whole line.

The plan of the government, now having inadequate resources, is to build a light provisional line over this summit, and later to connect the two valleys by a tunnel 4.5 kilometers in length (the cost of which could not now be thought of) and to so arrange the line that there should eventually be the least possible abandonment of the original road. This required the location to follow up the narrow valley of the river as far as possible, and even with the maximum grade of 3 per cent. this requires some development to reach a point in this very peculiar valley suitable for the portal of such a tunnel, being at K. 111+600, or at K. 113+800, and from this point to develop a line with 3 per cent. to cross the summit. The 14.6 kilometers (9 miles) shown on the plan cover a rise of 1,435 ft., including the summit cut, which is very short; but the total rise, counting the maximum grade employed in the valley lower down and not shown on the plan, amounts to 2,254 ft., not counting the summit cut. When it is remembered that the foot of the maximum grade is only four (4) miles distant from the summit on an air line grade, that the sides of the mountains are broken and cut by many streams, steep and rugged, and all covered by a dense, impenetrable jungle entirely hiding everything and making it necessary to cut one's way at every step, some idea can be formed of the labor involved in making such a location. Having a comparatively light grade, 16-degree metric curves*, with but two exceptions, where 20-degree were used, but will be changed to 16-degree later on, using viaducts at the points of curve and crossing the streams lower down, and all the time having in view the construction of a cheap provisional line, yet one that will serve all the purposes of the Department for half a century probably to come.

The locating party was in charge of Mr. Lucius D. Battle, who was for many years in the engineering department of the Louisville & Nashville. He continued at his post under the most trying and disheartening circumstances, and brought this bit of difficult location to a satisfactory termination.

The road is narrow (3 ft.) gage. Three per cent. maximum grades on all new construction and 16-degree metric curves; will be built in a substantial manner, good masonry, steel bridges, crushed rock ballast and generally first class for a narrow gage line. The construction will be comparatively light and easy. There will be eight viaducts about 50 ft. high, many small bridges of girder type and three through truss bridges over the Rio Nus. There may be four short tunnels—possibly deep cuts if only earth be encountered. The whole line from Puerto Berrio to Medellin is 205 kilometers (127.4 miles) long.

Surveying is very difficult, even in comparatively

into a river. Five minutes later the sun, with redoubled power, will be "cooking you in your shoes." Surely these are conditions of climate that writers of encyclopædias have a right to style "deadly to the white man."

Parts of this road will be above the clouds, amidst some of the most magnificent mountain scenery to be found in the world. All of the ruggedness of mountain scenery so notable as that other "Scenic Line of the World," the Denver & Rio Grande, is fully equaled here, but is softened and subdued by the everlasting verdure that clothes these mountains.

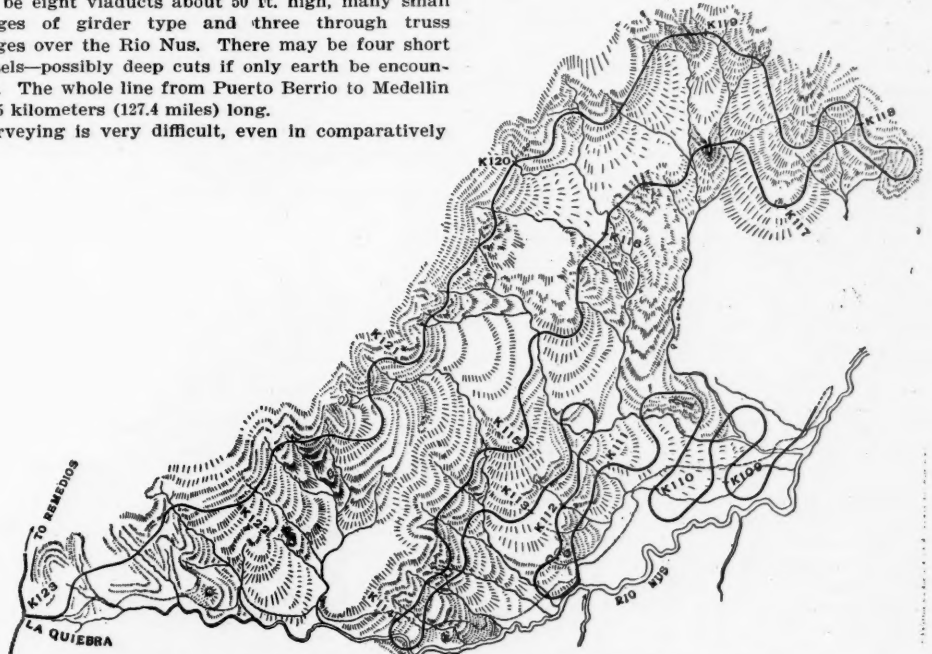
Concrete Fence Posts.

Concrete fence posts for right-of-way fences seem to be attracting considerable attention. The posts (made under patents) are rectangular in section, slightly tapering from the base toward the top. They may be of any height, depending upon the style of fence, and may be used with either board, barbed wire or woven wire fences. A suitable concrete for this purpose consists of one part of the best Portland cement to three parts of clean, sharp sand, sometimes the proportions being made as low as 2½ to 9. One barrel of cement is said to make from 18 to 20 posts of a size suitable for railroad fences.

The posts are cast in wooden moulds through which No. 10 two-wire cables, under tension, are run from top to bottom, so that the cables become embedded in the concrete. Four cables are used with the line posts, one near each corner, while eight cables are used in corner and gate posts. The cables are to hold the parts together should the posts be broken. When moulding the posts means are provided for fastening on the wires or boards, holes being bored at suitable intervals for receiving a wire loop, if the post is to be used with barbed wire fences, while for board fences clips are cast into the posts, to which the planks are fastened. In gate posts, holes are bored to receive the hinge bolts, the fastenings being secured in the same way as with wooden posts. The anchors for the corner and gate posts pass through cored holes.

Concrete line posts are made with a 4 x 5 in. horizontal section, weigh 96 lbs., and cost from 15 to 16½ cents each; corner posts are 8 x 8 in. in section, weigh 475 lbs., and cost about 54 cents each.

An engineer of maintenance of way of an important road, who has carefully considered the use of concrete posts, is of the opinion that, when made with care and of good materials their life might be 25 years, as they are not subject to decay, are not injured by fire and will not rust. He also considers that concrete posts might be used to advantage with signs made of malleable iron for bridge numbers, crossing signs, section and whistle posts, and, in fact, to replace wooden posts entirely along the right-of-way, thus saving the cost of painting. He further states that his road has to pay from 6 to 14 cents each



Difficult Location on the Antioquia Railroad, in the Andes Mountains, Colombia.

level, open valleys, as the dense tropical vegetation renders it impossible to see anything in advance. In fact it is so dense that one can only penetrate it by cutting a path in advance. The forests swarm with mosquitos, flies, gnats and all sorts of insect pests, to say nothing of the poisonous centipedes, tarantulas, scorpions and still more dangerous reptiles whose venom is certain death. Then, too, this work must be performed under the blistering rays of a tropical sun, which, in a few minutes, may be hidden by clouds and a mountain cloudburst (it is not a rain shower) will drench you as completely as if you had fallen

* Continental engineers designate curves by the radius in meters. A 1-degree curve has a radius of 1,746.4 meters = 5,730 ft.; a 16-degree metric curve has a radius of 358 ft., and a 20-degree 286 ft.

for wooden line posts, and that they are very unsatisfactory.

TECHNICAL.

Manufacturing and Business.

The Walker Company of Cleveland has received a very large foreign order for electrical apparatus from its Paris agency, the Exploitation des Procédés Electriques Walker. The order is for complete equipments for electric railroads, including 1,000 25-H. P. motors and 1,000 controllers. This apparatus is to be used in cities in Italy, France and Germany, and will be the standard make of the Walker Co. The order is to be filled in 15 months.

The Litchfield Car Works have been formed by the citizens of the town of Litchfield, Ill., to give em-

ployment to the employees of the old Litchfield Car & Machine Co., which moved its machinery, etc., to Memphis, Tenn., some time ago. The officers are: J. C. Sinclair, Vice President and Acting President; Joseph Bartman, Secretary; M. Morrison, Treasurer; J. J. Pearce, Superintendent. At first the new company will devote its attention to repair work. The shops are connected with several railroad lines, and are well situated and adapted to that class of work.

At a special meeting of the stockholders of the United States Headlight Co. it was decided to move the principal office and factory from Utica to Buffalo. The company has closed the Utica factory and is now running in all departments at 39 and 41 Perry street, Buffalo. All of the machinery and most of the employees were taken to Buffalo. The company has secured a larger building and one which will be more central for making shipments than it had at Utica.

An appeal has been taken from the recent decision of Judge Acheson, at Philadelphia, against the Union Switch & Signal Co., in a suit concerning the patents on Hall signals used on the Philadelphia & Reading.

H. K. Porter & Co., Pittsburgh, Pa., builders of light locomotives, report that at the present time the shops are well crowded with work, and that the outlook is for a larger volume of business for the entire year than for quite a number of years past. The company is installing compressed air plants for the Pennsylvania Coal Co. at Pittston, Pa., and the Ashland Coal & Iron Co., Ashland, Ky.

The New Jersey & Pennsylvania Concentrating Works of Edison, N. J., want one second-hand tank with a capacity of from five to eight thousand gals. In writing, give all dimensions and particulars as to thickness of material.

The McCord journal box lid has been specified on 500 cars for the Minneapolis, St. Paul & Sault Ste. Marie, on 2,000 cars for the St. Paul & Duluth to be built by the Wells & French Co., and on 1,000 box cars which the Chicago, Milwaukee & St. Paul is building at its West Milwaukee shops. It is also being used on passenger cars for the Cincinnati, New Orleans & Texas Pacific; Wabash, St. Paul & Duluth, and Georgia Southern & Florida, which are being built by the Barney & Smith Car Co. and the Ohio Falls Car Mfg. Co.

The Brooks Locomotive Works are building a large extension to be 22 x 80 ft., to their boiler shop. Fifty feet of the width is to be covered by a 10-ton traveling electric crane. All parts of the building except the side walls are to be of structural steel, furnished by the Buffalo Bridge & Iron Co. The old portion of the building, measuring 220x77 ft. 8 in., is to have a new roof and to be equipped with a riveting tower at one end and a 25-ton electric traveling crane of 50 ft. span to travel the entire length of the building, and to run over the 10-ton crane where the new part joins the old. Work is to be started immediately, and the structural steel is to be all in place within 11 weeks from July 14.

The Fall River Bleachery, at Fall River, Mass., has placed a contract for a new mill with the Berlin Iron Bridge Co. The building will be 65 ft. wide and 200 ft. long, with side walls of stone, the supporting framework being of steel.

Iron and Steel.

At the annual meeting of the Harrisburg Foundry & Boiler Co. the following Directors were elected: C. A. Disbrow, John A. Affleck, S. F. Dunkle, H. J. Forney, E. W. S. Parthmore, C. E. Forney, A. F. Aul, Morris Manderbach and G. W. Reily. The officers are: President, C. A. Disbrow; Vice-President, S. F. Dunkle; Treasurer, H. J. Forney; Secretary and Manager, J. A. Affleck.

New Stations and Shops.

The Great Northern Ry. has just completed a two-story warehouse at West Superior, Wis., 125 ft. wide by 1,540 ft. long, which is said to be the largest one on the lakes. The building of a second warehouse, and a large steel grain elevator at the same point is being considered, but up to this time nothing has been definitely decided.

It has been reported that the West Jersey & Seashore is contemplating building new train sheds and ferry houses at Camden, N. J., and that work on preliminary plans has been started. We are advised by the Pennsylvania Railroad that the company has no intention at the present time of doing such work.

The new shops and roundhouse which the Pecos Valley & Northeastern is building at Roswell will cost about \$40,000 exclusive of the lands and tracks. The contract for the work has been let. The main shop will be of brick, 60x140 ft., the car repair shop will be about 40x100, and the blacksmith and boiler shop 60x60. The tools have all been purchased from the Niles Tool Works, Hamilton, O.

Car Brass Record.

We have just received from the Ajax Metal Company a letter containing some interesting facts with regard to car brasses. The company has received recently 1,800 scrap car brasses from one of the great railroad companies to which the Ajax Company has been supplying brasses for nearly three years. The statement is that in that time the hot boxes originating from the structure or composition of the bearing

metal has not averaged over one-half of one per cent., and it is said further that of the 1,800 scrap brasses received not one had been heated. The composition furnished to this railroad is made especially for fast and heavy service. This strikes us as being a remarkable record, and if anyone can send a better one we should like to see it.

Some English Iron and Steel Figures.

From figures in the July 16 and July 23 issues of Ryland's Iron Trade Circular, published in Birmingham, England, we gather the following facts: On Dec. 31, 1897, there were 382 furnaces in blast in the United Kingdom, the pig iron production for the year being 8,789,455 tons, against 8,563,209 tons in 1896. The exports of iron and steel in 1897 were 3,691,065 tons, against 3,552,286 tons in 1896. The imports of iron and steel for 1897 were 108,120 tons, against 88,549 tons in 1896. In 1897 the United Kingdom imported from the United States 91,196 tons of pig iron, and 25,917 tons of steel. In the first half of 1898 the United Kingdom imported from the United States 30,281 tons of pig iron, against 44,597 in the first half of 1897, and 12,832 tons of steel in the first half of 1898, against 22,825 tons in the first half of 1897. The figures also show that previous to 1890 England was the largest producer in the world of pig iron, and since 1890 America has been the largest producer.

Electric Machinery for Santiago.

The Westinghouse Machine Co. has received the initial order for a complete steam plant, involving a 100 H. P. Westinghouse engine and Westinghouse generator, together with boiler, pump, piping, etc., to be installed in Santiago de Cuba.

Air Brake Decisions.

In addition to the decisions of the United States Courts requiring the removal of infringing New York brakes from the Buffalo, Rochester & Pittsburgh, and from the Great Northern, the United States Circuit Court for the District of New Jersey has rendered a decision in the case of the Westinghouse Air Brake Company vs. the Central Car Trust Company and the Commerce Dispatch Company. By this latter decision New York air brakes are required to be removed from 1,400 cars controlled by the defendants. The Court says: "There does not appear upon the record in this case any special matter which commends the defendants to the special consideration of the Court. . . . The complainants requested them to remove these brakes, and offered to supply their own device upon reasonable terms; but both the request and offer were declined. . . . For purposes of economy, as charged in the bill and not denied, they purchased those cars equipped with the brake of the New York Air Brake Company, with notice that it was an infringement on the claims of the patent in suit. . . . If they now suffer inconvenience through being obliged to discontinue the use upon their cars of the complainant's device, it will not be greater than they might have anticipated."

A Large Car Float.

The Interstate Sand & Car Transfer Co., of St. Louis, has lately built a boat for carrying freight cars, which is 300 ft. x 46 ft. It has four tracks and will carry 32 cars. The depth of hold is 10 ft., and the barge when loaded will draw about 4½ ft. of water.

Contracts at the Brooklyn Navy Yard.

Contracts for nearly \$760,000 worth of work at the New York Navy Yard will be awarded during the next few weeks, the principal job being the repair of timber dock No. 2, which is in need of a new entrance and extensive alterations. This work will not be undertaken until the new timber-dock is completed, on which the contractor's time expires in about two weeks. The other contracts are for two new storehouses, to cost \$70,000, the extension of the railroad system, \$25,000, and for a crane, \$100,000. It has not been decided whether a traveling crane or a floating crane will be built.

THE SCRAP HEAP.

Notes.

Sept. 17 will be "Railroad Men's day" at the Omaha fair.

The local freight agents in Wheeling, W. Va., acting in accordance with an agreement recently reached in their association, have abandoned the practice of sending around clerks on regular trips to the offices of consignees to collect freight bills.

Judge Tuley in the Circuit Court at Chicago, in the case brought by the Illinois Manufacturers' Association against the United States Express Co., has decided that the Express Company is required to pay the tax. It is stated that the Express Company will carry the case to a higher court.

Wells, Fargo & Co. have presented gold watches to R. E. Buchanan and L. L. White for bravery in repulsing train robbers on the Atchison, Topeka & Santa Fe at Coleman, Tex., June 9. Mr. Buchanan is claim agent for the railroad company, and Mr. White is messenger for the express company.

The action of the Pennsylvania Railroad in reducing the working forces at Altoona and other places, seems to have been partially revoked within only a week after its first announcement. Press dispatches of this week say that "work has been actively re-

sumed," though apparently the men in the shops do not work full time.

The Equipment Register calls attention to the fact that under the new postal card law railroad companies may send their own postal cards through the United States mails, by affixing to each card a one-cent stamp. The cards must be not larger than 3¼ in. x 5½ in., and must be similar in quality to those made by the Government.

Attacks upon freight trainmen by tramps are reported frequently and from roads in various parts of the country. Near Blair, Neb., a gang of 100 took possession of a freight train. Near Camden, N. J., 10 men made a desperate assault on a freight conductor. Five of the men were soon afterward arrested and sentenced to imprisonment.

Train No. 9, the Black Diamond Express, of the Lehigh Valley, on July 20 ran from Sayre to Buffalo, 176 miles, in 2 hours, 59 minutes. The engine was No. 666; engineer, Thos. Farley. The train left Sayre at 5.56 p. m., 27 minutes late, stopped five minutes at Geneva and five minutes at Rochester Junction, and arrived at Buffalo at 9.55 p. m., on time, making the actual running time from Sayre to Buffalo 169 minutes, which includes three slow downs, one at Manchester, one at Depew Junction and one at East Buffalo yard. The run from Alpine to Geneva, 46 miles, was made in 38 minutes, an average of 73 miles an hour. The average from Sayre to Buffalo, excluding the five-minute stops, was 62½ miles per hour.

The Merchants' Association of New York is pressing its lawsuit to compel the express companies to bear the cost of the revenue stamp on bills of lading, and the president of the association tells the reporters that a strong public sentiment is being worked up in the matter. He says that there are five companies in New York City which make it their business to combine in one large package the smaller packages of different consignors for one consignee, and he intimates that the merchants will encourage these packers in order to diminish the cost of express service and thus retaliate on the companies for their course in the matter of the revenue stamps. The packing companies are talking of giving a more substantial character to their business by qualifying themselves to give large bonds to shippers for the faithful performance of their work and the prompt settlement of claims. While the encouragement of this business will no doubt affect the express companies' incomes, it will probably occur to most of those interested that probably the merchants and the packers will pursue the same course, even after the express companies have surrendered on the stamp tax question. The Northern Pacific Express Company pays the cost of the stamps on bills of lading, and the Great Northern Express Company, to meet the competition of the Northern Pacific, has decided to do the same.

A Bridge Accident in India.

In "Indian Engineering," some months ago, were given details of a railroad accident which took place on the 23d of September, 1897, caused by the destruction of the Mullor bridge, on the line from Bangalore to Mysore. This bridge, which was built about sixteen years ago, consisted of eight stone arches, of which four were 8.39 meters span, while at each end were two arches of 7.62 meters span. The piers were composed of columns founded on cribs of brick work, sunk by a water jet to firm ground in the bed of the river. Piers No. 2 and No. 7 rested on piles driven in the earth. Pier No. 5 rested on four cribs of 1.83 meters diameter on the bed rock, which was reached at a depth of 6.7 meters below the bed of the river. Pier No. 6 was built on two cribs of 3.35 meters diameter, said to rest on the bed rock at nine meters depth. The bed of the river is here of sand, and the velocity of the current is 4.5 meters per second. The wrecked train left Bangalore about 9.25 p. m., and was partly thrown into the river. A photograph, taken immediately after daylight, showed the situation as follows: Pier No. 5 was broken down in the direction of the axis of the bridge. Pier No. 6, which had a breadth of 2.4 meters, was broken off in the middle, in the direction of the stream. The destruction of these two piers was followed by that of the fourth, fifth and sixth spans of the bridge. The locomotive, tender, a baggage car and four third class cars disappeared in the flood. The second class coach, which was immediately behind, took a nearly vertical position, one end in the water and the other hanging on pier No. 4. The first class car, which came next, and the remainder of the train, stayed on the track. Opinions as to the cause of this catastrophe were very different. When it was possible to examine the wrecked train in the bottom of the river, it was found that the stream had undermined pier No. 6. It was at first believed that many lives had been lost and this was said to be the most serious accident that had ever taken place on the Indian railroads, but the final reports place the number of the dead at 16, of whom four were trainmen.

An Electric Omnibus.

The Berlin General Omnibus Company, on the 25th of May, made a trial trip with the first electrically driven omnibus from Kurfürstenstrasse to Halensee. According to the daily papers, the trip was especially satisfactory. The omnibus was fitted up like an elegant saloon car for 26 people, and showed itself easily manageable on all kinds of pavements and worked perfectly through the whole trip.

The Voter in Prussia.

Following the example of the management of the Bavarian railroads, the management of the Prussian State Railroad system has issued a circular calling particular attention to the fact that every subject of the empire has a constitutional right to

vote for the candidates of his choice in elections. Special care is therefore to be taken to arrange the working hours of the different departments that officers and employees shall have the opportunity to deposit their ballots without loss of pay for the time necessary to do this.

The Danube Canal.

An excursion took place on the 28th of May, of the Vienna Traffic Association, to visit the works now building for the Danube canal at Nussdorf. The works may be divided into two groups, the first including an extensive addition to the present arrangements for controlling the high water level in the canal, and the second consisting of the flood gates, feeding canals, etc., and the arrangements for the entrance to and exit from the Danube canal at high water in the river, and the necessary bridges and other appurtenances. The stone work for the gates is already in place. By an addition to the original plan, the work has been enriched by treatment of the design from an architectural point of view. On each of the stone pillars which form the terminal at the side walls, Prof. Weyr has placed a boldly executed figure of a lion keeping watch, his gaze directed toward the upper Danube. This change greatly heightens the impression upon the beholder that there has been executed a magnificent work for the development and protection of the city. The bridges, of which there are two lines, one of which serves for the manipulation of the gates, and the other for the accommodation of the traffic between the two sides of the canal, are now nearly built and will be completed during the course of the summer. The enormous gate for the head of the canal, 85 meters in clear length and 15 meters in width, is also nearly ready. The upper and lower ends of the masonry walls were laid by means of a pneumatic caisson, while the excavations for the intermediate side walls and the base wall to a depth of four meters below the bottom of the gate were taken out by a hydraulic excavator, a work of considerable difficulty on account of the water. The iron gates, 10 meters high, which are constructed to withstand a water pressure of possibly nine meters on one side, as well as the granite masonry, give the impression of the greatest solidity.

Don't Meddle with a Passenger's Bundles.

The legal department of the Burlington & Missouri River is reported to have ruled as follows: "When a passenger presents himself for passage with property that under the rules of the company is not allowed to be carried by passengers, then the duty of the company is to refuse such passenger passage, with such property in his possession; and if he has succeeded in getting into the car with such property, and refuses to have the same shipped as freight or express, then both he and his property should be removed from the car. The railroad company has no right to take the merchandise from him against his will. If the company should take it from him and remove it from the car the company would become the voluntary custodian, and would be liable to restore it, or answer for its value in damages; but the passenger has no right to ride in the car with such merchandise, and consequently the company's duty would be in case he would not agree to ship it as freight or express, to remove both passenger and merchandise from the car. If after removal he should choose to abandon his property and having a ticket entitling him to personal passage, he would then have the right to abandon his property and ride in the car as a passenger, and the company would not be responsible for the property abandoned."

Rails Bent by Heat.

As an additional example of tracks bent by heat, the following contribution is offered, from "Glaser's Annalen" of July 1, this year: On the 3d of May at 4 p. m., after two unusually hot days, a stretch of rail in the street railroad track on Luisenstrasse (Berlin), bulged up from the pavement for a length of 33 ft. The arc formed measured 6 in. in height. The opposite rail in the same track showed no disruption whatever, and there still remained a small space between the rail ends at the splices.

Transportation to Cuba and Porto Rico.

The Porto Rico Commercial Company has been incorporated in New Jersey to do a general shipping and commission business, build docks, etc., operate railroads and telegraphs and carry freight and mail. Among the stockholders are William D. Martin of New York, and A. L. McDermott of Jersey City.

The Cuban & Pan-American Express Co., with a capital of \$500,000, has been incorporated under the laws of New Jersey to do business between the United States and Cuba, Porto Rico, Colombia and Venezuela. The articles of incorporation also authorize the company to build and operate vessels, docks and warehouses, reclaim submerged lands, etc. The president of the company is Gen. E. C. O'Brien, recently a Dock Commissioner of New York City.

The Boston Elevated.

On July 28 the Railroad Commissioners adopted the plans for building the stations and the approaches and details of tracking of the proposed structure of the Boston Elevated Railroad. The location of the stations and the general plans for the building of the road were approved some time ago. Very few changes have been made by the Commissioners from the plan as originally presented by the railroad company, and these have been promptly accepted by the latter.

LOCOMOTIVE BUILDING.

The Central of New Jersey is asking bids on from three to 10 heavy engines for freight service. Six will probably be bought.

The Baldwin Locomotive Works has received an order from the Baltimore & Ohio Southwestern for 10 heavy consolidation freight locomotives.

H. K. Porter & Co. of Pittsburg, Pa., are building some locomotives of special design for the Arizona Copper Co., and for the Jalapa Railroad & Power Co. of Mexico.

We understand that the order given to the Pittsburgh Locomotive & Car Works by the Missouri, Kansas & Texas, and referred to in our last issue, was for five mogul engines, with an option on five more.

We are officially informed that the Lake Erie & Western will need 20 or 30 engines of the mogul type, with 20x26 in. cylinders, for use in connection with the Cleveland & Newcastle Railroad, which will prob-

ably be operated as an extension of the Lake Erie & Western.

The Plant System has asked prices on 20 10-wheel engines, part for freight and part for passenger service. We understand that the contract will not be given for a week or 10 days at least, and that it is not certain that the full number will be bought at that time. The matter is in the hands of Vice-President Erwin.

In our issue of July 1 we stated that the Delaware, Lackawanna & Western had ordered two eight-wheel passenger engines from the Dickson Locomotive Works. The principal dimensions are: Cylinders, 20x26 in.; driving wheels, 65½ in. diam.; weight, total, 128,000 lbs.; on drivers, 88,000; boiler, Wooten, with 128,000 lbs.; on drivers, 88,000; boiler, Wooten, with tank capacity for water, 4,000 gals.; for coal, six tons. The engines will be equipped with Westinghouse brakes, Midvale tires, Snow bell ringers, Lappin brake shoes, Gould couplers, Monitor injectors, Jerome piston and valve rod packings, Leach sanding devices, Nathan lubricators, National springs, Crosby steam gages and Gold steam heat equipment.

The Mobile & Ohio has placed an order with the Rogers Locomotive Co. for 10 freight and 10 passenger engines. They will be 10-wheelers, with 18x26 in. cylinders, the former to weigh 124,500 lbs., with 97,800 lbs. on the drivers, and have 56 in. driving wheels and 180 lbs. steam pressure, and the latter to weigh 125,000 lbs., with 98,000 lbs. on the drivers, and have 62 in. driving wheels and 185 lbs. steam pressure and Safety Car Heating & Lighting Co.'s steam heating equipment. Both types will have fireboxes 108½ in. long and 33½ in. wide, and be furnished with New York air brakes, steel axles, National hollow brake beams, Lappin brake shoes, Gould couplers, No. 9 Monitor injectors, U. S. Metallic piston and valve rod packings, Coale safety valves, Leach sanding devices, No. 9 Nathan triple sight feed lubricators, French springs, Crosby steam gages and steel tires. They are for October delivery.

CAR BUILDING.

The Union Pacific has ordered 250 ballast cars for the Rodger Ballast Car Co.

The Buffalo, Rochester & Pittsburgh is asking prices on from 300 to 500 freight cars.

The Baltimore & Ohio has placed an order with Pullman's Palace Car Co. for 1,000 gondola and 1,000 box cars.

The St. Louis Southwestern is in the market for six chair, four parlor and two combination baggage and passenger cars.

The St. Joseph & Grand Island has placed an order with the Mt. Vernon Car Mfg. Co. for 100 box cars of 60,000 lbs. capacity, 50 stock cars and 25 coal cars, all for September delivery.

We are officially informed that the Lake Erie & Western will need 2,000 or more coal cars. We understand that some passenger cars will also be bought. (See Locomotive Building, column.)

The Terre Haute & Indianapolis is building 38 Pennsylvania standard Gk gondola cars of 80,000 lbs. capacity. We referred to an order of 85 cars of the same pattern, given to the Terre Haute Car Mfg. Co., in our issue of April 8.

The 300 cars for the Chicago Great Western, referred to in our last issue, were included in a contract dated Nov. 12, 1897, just filed with the Secretary of State of Kansas by Pullman's Palace Car Co. The amount involved is \$153,135, 15 per cent. to be paid in cash and the balance in 27 monthly payments.

In our issue of July 22 we stated that the Minneapolis, St. Paul & Sault Ste. Marie had given an order to the Russel Wheel & Foundry Co. for 20 cars. They are known as No. 2 logging cars, are for August delivery and will be equipped with Westinghouse air brakes and Safford link and pin couplers.

The Union Pacific has placed an order with the Michigan-Peninsular Car Co. for 1,000 box cars of 60,000 lbs. capacity, and 150 furniture cars of 50,000 lbs. capacity. The box cars will weigh 33,000 lbs., and will be 34 ft. long, 8 ft. 10 in. wide, and 6 ft. 9 in. high inside. The furniture cars will be 50 ft. long, 8 ft. 9 in. wide and 9 ft. high inside. All the cars will be furnished with Congdon brake shoes, Westinghouse brakes, Hewitt brasses, Buckeye couplers, Cushing draft rigging, pressed steel journal box lids, Scott springs and diamond trucks. The box cars will have Johnson door fastenings, Security doors and Winslow roofs, and the furniture cars National door fastenings and Hutchins' roofs.

In our issue of March 4 we referred to an order of 100 flat and 150 box cars, given by the Washington County to the Union Car Co., and in our issue of July 8, to some passenger and baggage cars given to Jackson & Sharp. The freight cars will be of 60,000 lbs. capacity, 34 ft. long and 8 ft. 9 in. wide; the box cars to be 7 ft. ¼ in. high inside. The passenger cars (eight coaches and two smoking, three combination and two baggage cars) will be fitted with Miller couplers, Safety Car Heating & Lighting Co.'s heating system, Standard platforms and cast iron wheels. The freight cars will have composite bolsters and brake beams, New York air brakes, improved Standard couplers, M. C. B. journal boxes with Morris lids, and Pennsylvania X springs. The box cars will have Winslow metallic roofs. The freight cars are for delivery from June to August, and the passenger cars Sept. 15.

BRIDGE BUILDING.

ARNPRIOR, ONT.—An iron bridge will be built by the town of Arnprior.

BRANTFORD, ONT.—A 500-ft. cantilever bridge and several smaller structures will be built on the line of the new Brantford & Woodstock Electric Ry. R. L. Middleton, Engineer, Brantford.

BROWNSVILLE, TENN.—The War Department has approved the plans for a bridge to be built by the County Court of Haywood, over the Big Hatchie River, near Brownsville.

CINCINNATI, O.—Bids are asked for until Aug. 20 for building a bridge on Riddle Road, Springfield Township. E. L. Lewis, Auditor, Hamilton County.

CLEVELAND, O.—It is stated that bids are asked until Aug. 19 for building the Willet St. viaduct. Geo. R. Warden, Director of Public Works.

CREIGHTON, PA.—The Creighton Bridge Co. of Pittsburgh is reported incorporated, with a capital of \$100,000, to build a bridge over the Allegheny River. The directors are M. D. Weyman, C. G. L. Pepper and J. F. Pepper, all of Tarentum.

DAYTON, O.—Montgomery County will issue \$71,000 in bonds to cover cost of building and repairing bridges.

DELAWARE, O.—It is stated that bids are wanted, Aug. 19, by the Commissioners of Delaware County for building a steel bridge over the Olentangy River in Liberty Township.

DILLON, MONT.—The Commissioners of Beaverhead County will receive bids until Sept. 5 for building an iron bridge 60 ft. long at Montgomery crossing over Big Hole River. E. H. Mayers, Clerk.

GUELPH, ONT.—An iron or steel bridge will be built on the town line near Eden Mills. J. Hutcheson, Engineer, Guelph.

HAMILTON, O.—Press reports state that plans have been submitted to the Commissioners of Butler County for building a bridge over the Miami River at Wood street, to be 400 ft. long and to cost about \$79,000.

LANCASTER, PA.—Press reports state that the Commissioners of Lancaster County will build a steel bridge at Cocalico over the Cocalico River. Wm. W. Grist, County Clerk.

LINDSAY, ONT.—A new steel bridge will replace the present one at Lindsay Street.

PENDLETON, ORE.—The Union County Court has decided to build two bridges, one over Birch Creek and another over Little Camas River.

RAT PORTAGE, ONT.—The Ontario Government will build a steel bridge over the eastern channel, Lake of the Woods, to accommodate traffic between this town, Norman and Keewatin.

RICHMOND, QUE.—It is stated that Messrs. Vincent & Dufresne, of Montreal, are preparing plans for a steel bridge to be built at Richmond over the St. Francis River.

ROSEBURG, ORE.—Bids will be received at the office of the Clerk of Douglas County until Sept. 8 for building a wagon bridge over Elk Creek. J. Lyons, County Judge.

SALEM, MASS.—Bids are asked until Aug. 8 for rebuilding and widening the Forest River bridge. E. B. Bishop, Chairman, Essex County Commissioners.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Buffalo, Rochester & Pittsburgh.—Preferred, 1 per cent., payable Aug. 5.

Kansas City, St. Louis & Chicago.—Preferred, guaranteed, quarterly, 1½ per cent., payable Aug. 1.

Louisiana & Missouri River.—Preferred, guaranteed, 3½ per cent., payable Aug. 1.

Pittsburgh & Lake Erie.—Five per cent., payable Aug. 1.

Boston Elevated.—2½ per cent., payable Aug. 15.

West Chicago St.—Quarterly, 1½ per cent., payable Aug. 15.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

American Association for the Advancement of Science will meet in Boston Aug. 22 to 27 inclusive.

American Society of Civil Engineers.—Meets at the house of the society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month at 8 p. m.

American Street Railway Association will hold its annual meeting at Boston Sept. 6 to 9.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7.30 p. m.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

Chicago Electrical Association.—Meets at Room 7,137, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, secretary.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Thursday of each month, excepting July and August, at 7.30 p. m.

Engineers' Club of Columbus (O.).—Meets at 12½ North High street on the first and third Saturdays from September to June.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Engineers' Club of Philadelphia.—Meets at the house of the club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month at 8 p. m., except during July and August.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month at 7.30 p. m.

Locomotive Foreman's Club.—Meets every second Tuesday in the clubroom of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Master Car and Locomotive Painters' Association.—Annual convention, St. Paul, Minn., Sept. 13.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7.30 p. m.

National Railroad Master Blacksmith Association.—Sixth annual convention, Boston, Sept. 6.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.

Society for the Promotion of Engineering Education.—Will hold its annual meeting at the Massachusetts Institute of Technology, Boston, Aug. 18 to 20.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Street Railway Accountants' Association of America.—Will hold its second annual meeting in Boston Sept. 6 to 9.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month at 8 p. m.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is secretary.

Western Railway Club.—Meets in Chicago on the third Tuesday of each month at 2 p. m.

Western Society of Engineers.—Meets in its rooms on the first Wednesday of each month at 8 p. m., to hear reports and for the reading and discussion of papers. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago.

The Southern and Southwestern Railway Club.
The next regular meeting of the club will be held at the Kimball House, Savannah, Ga., on Aug. 11, at 10 a. m. The following subjects will be discussed: "Trains Parting," "The Most Expeditious Method of Hauling Troops," and "Conditions of Journal and Bearings." The members are urged to forward communications relative to these subjects or to other topical subjects which they desire to consider should they be unable to attend in person.

Western Society of Engineers.
A meeting of the Western Society of Engineers was held Wednesday evening, Aug. 3, in the Society rooms, Monadnock Block, Chicago. Mr. George H. Bryant, of Thomas Prosser & Son, read a paper entitled "Hollow and Solid Steel Forgings." Mr. A. Torrey, Chief Engineer of the Michigan Central RR., presented a short paper—"A Storage Reservoir for a Water Station"—a portion of which is reprinted in this issue. The subject "Locomotive Water Supply" was discussed, a paper on this subject having been read by Mr. T. W. Snow at a former meeting.

American Street Railway Association.
The Secretary announces the following list of papers to be read at the annual meeting at Boston Sept. 6 to 9:
"Maintenance and Equipment of Electric Cars for Railways." By M. S. Hoskins, Electrician Columbus Street Ry. Co., Columbus, O.
"To What Extent Should Railway Companies Engage in the Amusement Business?" By W. H. Holmes, General Manager Metropolitan Street Railway Co., Kansas City, Mo.
"The Carrying of United States Mail Matter on Street Railways." By W. S. Dimmock, General Superintendent Omaha and Council Bluffs Railway and Bridge Co., Council Bluffs, Ia.
"The Comparative Earnings and Economy of Operation Between Single and Double Truck Cars for City Use." By Richard McCulloch, Electrical Engineer Cass Ave. and Citizens' Railway Co., St. Louis, Mo.
"Inspection and Testing of Motors and Car Equipment by Street Railway Companies." By Frederick B. Perkins, Electrical Engineer Toledo Traction Co., Toledo, O.
"Cost of Electric Power for Street Railways at Switchboards: Both Steam and Water." By R. W. Conant, Electrical Engineer Boston Elevated Railway Co., Boston, Mass.
The following committees have been appointed:
General Committee—C. S. Sergeant, 101 Milk St., Boston, Chairman, and ten members.
Committee on Entertainment—P. L. Saltonstall, Boston, Chairman, and ten members.
Committee on Halls, Hotels and Registration—E. C. Foster, 333 Union St., Lynn, Mass., Chairman, and nine members.
Committee on Exhibits—Charles S. Clark, chairman, and eleven members.
Committee on Transportation and Information—Julius E. Rugg, Chairman, and ten members.
Banquet Committee—A. A. Glasier, Chairman, and six members.

Society for the Promotion of Engineering Education.
As previously announced, the sixth annual meeting will be held at the Massachusetts Institute of Technology, Boston, Aug. 18 to 20, the first meeting being held Thursday morning at 9.30. The afternoons of Thursday and Friday have been left open for trips at the pleasure of the members. A uniform round trip rate of 1½ fare from all points to Boston has been secured for those attending the meeting, tickets being good for arrival from Aug. 17, and for departing until Sept. 15. On Thursday morning after the report of officers, the election of members, the transaction of general business and President Johnson's address, the following papers will be taken up:
"The Mutual Adjustment of Class-room and Laboratory Instruction." By Gaetano Lanza.
"The Mounting of a Spherical Blackboard." By A. E. Haynes.
"Notes on the Organization of an Engineering Laboratory." By H. B. Smith.
On Thursday evening Dr. R. H. Thurston will address the society on "The Correct Theory and Method of Organization and Conduct of Professional

Schools." Should there be sufficient time a report will also be given by Prof. H. W. Tyler, Chairman of the Committee on Entrance Requirements. The following papers will be read:

Friday Morning.
"Some Phases of Engineering Education in the South." By J. J. Willmore.
Report of the Committee on Uniformity of Symbols, T. C. Mendenhall, Chairman.
"The Study of Electricity in Courses Other than Electrical." By J. P. Jackson.
"A Course in Industrial Chemistry for Technical Schools." By F. L. Dunlap.
"A New Laboratory Apparatus for Illustrating Longitudinal Impact." By W. K. Hatt.
Friday Evening.
"The Direct Study of Thermodynamics." By S. A. Reeve.
"Laboratory Instruction in Electrical Engineering." By R. B. Owens.
"A Course in Highway Engineering for Civil Engineers." By W. R. Hoag.
"Notes on Some Methods in Use in an Engineering Laboratory." By F. C. Caldwell.
Saturday Morning.
"Sanitary Science as a Part of Every Science Course." By W. T. Sedgwick.
"The Conduct of Thesis Work." By Edgar Marburg.
"The Construction of Models by Students as an Aid in Teaching Descriptive Geometry." By H. S. Jacoby.
"The Training of Engineers for the Maintenance of Way Department on Railroads." By J. C. Nagle.
A business meeting will be held before final adjournment.

PERSONAL.

—Mr. J. W. Alexander, at one time a Director in the Georgia Midland & Gulf, died at McDonough, Ga., July 20.

—Mr. Charles S. Wolff, Chief Clerk in the Pennsylvania Co.'s office of Engineer of Maintenance of Way in Cincinnati, O., for 16 years, died July 27.

—Mr. H. Tandy, Superintendent of the Brooks Locomotive Works, has resigned to accept the Superintendency of the Canadian Locomotive Works at Kingston, Ont.

—Mr. Edward Appleton died at Reading, Mass., July 31. He was a Civil Engineer and for several years was President of the Troy & Greenfield RR. He was once a Railroad Commissioner of Massachusetts. He was 82 years old.

—Mr. Glenn H. Logan, who has been Traveling Auditor of the Missouri Pacific, with headquarters in Kansas City, has been appointed a Paymaster, with the rank of Major, in the Volunteer Army, and is assigned to service in the Philippine Islands.

—Mr. Ezekiel W. Woodward, civil engineer, died in West Springfield, Mass., July 19. He was an Assistant Engineer of the location and building of the Cincinnati, Hamilton & Dayton, and on the survey of the Michigan & Dayton. In 1851 he was appointed Chief Engineer of the Cincinnati, Wilmington & Zanesville, and five years later he became Superintendent of the Steubenville & Indiana. In 1878 he was appointed Commissioner to sell the St. Louis Bridge & Tunnel Company's property and was elected Vice-President on the company's reorganization.

—Announcement was made on July 22 of the appointment by President McKinley of Mr. Ferdinand W. Peck, of Chicago, as Commissioner General from the United States to the Paris Exposition in 1900. This appointment is received with great satisfaction in Chicago, where it is felt that Mr. Peck's connection with the directory of the World's Fair in 1893 especially fits him for his new work. Mr. Peck was born in Chicago in 1848 and received his education there, graduating from the University of Chicago and the Union College of Law. Mr. Peck has given freely of his time and means for the educational and artistic advancement of Chicago, and is prominently identified with the various institutions of this kind in the city. The Auditorium was his conception and he has been president of the Auditorium Association since the building was designed. He was also one of the seven original incorporators of the World's Fair, and as chairman of the Finance Committee was most successful in collecting and disbursing the funds, and took personal interest in making the Exposition architecturally beautiful. Mr. Peck is a trustee of the University of Chicago and a member of many social clubs in the city.

ELECTIONS AND APPOINTMENTS.

Astoria & Columbia River.—T. W. Hansell has been appointed Superintendent of Machinery with headquarters at Astoria, Ore.

Atchison, Topeka & Santa Fe.—The position of Division Master Mechanic at Topeka, formerly held by George W. Smith, now Superintendent of Machinery of the Santa Fe Pacific, is abolished.

A. C. Jobs, president of the Bank of Commerce, Wichita, Kansas, has been elected a Director to fill the vacancy caused by the death of Thomas A. Osborn.

Baltimore & Ohio.—G. A. Richardson, formerly Chief Clerk for J. M. Graham, General Superintendent of the Trans-Ohio Division, has been appointed Assistant Superintendent of the Straitsville Division with headquarters at Newark, O. The appointment took effect Aug. 1.

J. P. Fitzgerald has been appointed Trainmaster of the Straitsville Division with headquarters at Chicago Junction, Ohio. T. J. Daley, formerly Assistant Chief Clerk in the General Superintendent's office, has been appointed Chief Clerk to General Superintendent Graham, vice G. A. Richardson.

Cape Fear & Northern.—The officers of this road, referred to in the Construction column, are as follows: President, B. N. Duke, Durham, N. C.; Vice-President, E. J. Stagg; General Manager, J. C. Angier, Holly Springs, N. C.; General Auditor, T. F. Wilkinson.

Central of Georgia.—Edgar Hodgins has been appointed Chief Storekeeper with headquarters at Augusta, Ga.

Central Union Depot & Railway.—The position of Assistant Superintendent, lately held by H. S. Johnson, at Cincinnati, O., has been abolished. (July 29, p. 555.)

Chesapeake & Ohio.—The Freight Claim Agency of this road, with headquarters at Richmond, Va., has

been abolished. J. F. Orndorff, who was lately in charge of the freight claim department, has moved his office from Richmond to Cincinnati, O., where he will have charge both of Freight Claims and of the Tariff Bureau, with the title of Assistant General Freight Agent. (July 29, p. 555.)

Chicago, Peoria & St. Louis.—Ralph Blaisdell, Auditor, has been appointed Auditor for the Receivers.

Cleveland, Cincinnati, Chicago & St. Louis.—Effective Aug. 1, H. F. Houghton, who has been Assistant Superintendent of the line between Cincinnati and Chicago, was appointed Superintendent and the office of Assistant Superintendent was abolished. G. W. Bender, who has been Superintendent of this Division, was made Superintendent of Terminals at Indianapolis.

Colorado & Northwestern.—At the annual meeting of stockholders held July 19 at Boulder, Colo., W. C. Culbertson, Girard, Pa., was elected President, vice E. C. Thompson, Meadville, Pa.; C. B. Culbertson, Girard, Pa., was elected Secretary.

Cornwall.—C. G. Herman, Master Mechanic at Lebanon, Pa., has resigned to accept a position with the Baldwin Locomotive Works.

Emmitsburg.—The following officers were elected upon the reorganization of this company: James A. Eder, President; William A. Hines, Vice-President; William G. Blair, Treasurer; Dr. J. B. Brawent, Secretary; Vincent Sebold, Counsel.

Erie.—Frank Johnson has been appointed Master Mechanic of the Mahoning Division, succeeding Willard Kells, promoted, with headquarters at Cleveland, O.

Fitchburg.—A. H. Harris, heretofore General Traffic Manager of the Intercolonial, has been appointed Canadian Traffic Agent, with headquarters at Montreal.

Florida Central & Peninsular.—William Butler has been appointed Traveling Passenger Agent and W. B. O'Dwyer has been appointed Freight Traffic Agent, with headquarters at Savannah, Ga.

City Passenger and Ticket Agent J. M. Fleming, Jr., has been transferred from Jacksonville to Tampa, Fla., and J. F. Martin has been promoted from Soliciting Freight Agent at Jacksonville, Fla., to Traveling Freight Agent, with headquarters at Mobile, Ala.

Georgia Southern & Florida.—O. M. Grady, formerly Roadmaster, has been appointed General Superintendent, succeeding the late Jeff. Lane, with headquarters at Macon, Ga. (July 1, p. 484.) Mr. Grady will report to Vice-President Shaw.

R. D. Grey, formerly Chief Clerk to Mr. Lane, has been appointed Purchasing Agent, the duties of which office were formerly discharged by Mr. Lane.

Hancock & Calumet.—At the annual meeting held July 12, at Marquette, Mich., the following directors were elected: A. B. Eldridge, C. H. Call, A. E. Miller, of Marquette, Mich.; J. C. Shields, Hancock, Mich.; A. S. Bigelow, Boston, Mass.; W. E. Parnall, Calumet, Mich. The following officers were then elected: A. B. Eldridge, President; C. H. Call, Vice-President; A. E. Miller, Secretary; E. W. Allen, Treasurer; George H. Church, Assistant Secretary, Assistant Treasurer and Transfer Agent.

Hannibal & St. Joseph.—W. W. Lowell has been appointed Division Master Mechanic with headquarters at Brookfield, Mo., succeeding Mr. Lamb.

Houston & Texas Central.—P. A. Gorman, who was recently appointed Assistant Superintendent of the Waco Branch of the H. & T. C., formerly the Waco & Northwestern, had been heretofore General Manager for the Receiver of the W. & N. W. (July 15, p. 521.) Mr. Gorman reports to and receives instructions from L. A. Daffan, Superintendent of the Second Division H. & T. C., Ennis, Tex.

Intercolonial.—W. Rennels, Division Superintendent of the Intercolonial at Campbellton, N. B., has been transferred to a similar position at Trro, N. S., vice J. E. Price, promoted. (July 8, p. 502.)

Interoceanic of Mexico.—William Rees has been appointed General Master Mechanic with headquarters at Puebla, Mexico.

Iowa Central.—George W. Seever of Oskaloosa, Ia., has been appointed General Counsel, with headquarters at Oskaloosa.

Kansas City, St. Joseph & Council Bluffs.—C. E. Lamb has been appointed Master Mechanic, with headquarters at St. Joseph, Mo. Mr. Lamb was heretofore Division Master Mechanic of the Hannibal & St. Joseph, with headquarters at Brookfield, Mo.

Lake Shore & Michigan Southern.—William Weaver has been appointed Roadmaster of the Lansing Division, succeeding F. M. Rummel, transferred.

F. M. Rummel, Roadmaster of the Lansing Division, is transferred to the Elkhart Division with headquarters at Adrian, Mich., to succeed Charles B. Hoyt.

Lehigh Valley.—John Hawthorne has been appointed Master Mechanic, with headquarters at Sayre, Pa., vice J. N. Weaver. He will also have charge of motive power affairs on the Auburn Division, assisted by George F. Richards, Assistant Master Mechanic, with headquarters at Cortland, N. Y. Mr. Hawthorne was heretofore Master Mechanic of the Chicago & Erie, with headquarters at Huntington, Ind. (See Erie.)

The maintenance of way force on the Buffalo Division has been put in charge of J. A. Vanderhoeck, Division Engineer. He will report to L. H. Van Allen, Superintendent.

Since the resignation of L. H. Shearer, Roadmaster at Buffalo, the offices of Roadmaster and Assistant Roadmaster have been abolished. The following have been appointed Supervisors: P. M. Dinan, Daniel Harley, John Nash and Charles N. Barton. They will report to the Division Engineer.

James Donnelly, Superintendent of the Easton & Amboy and the Lehigh Division, has resigned.

Louisville & Nashville Terminal.—E. C. Lewis, President, has officially announced that in addition to J. G. Metcalfe, General Manager, and R. Montfort, Chief Engineer, heretofore appointed, the following appointments have been made: Cushman Quar-

rier, to be Comptroller, and P. P. Huston to be Purchasing Agent, with headquarters at Louisville, Ky.

Maine Central.—Arthur Sewall Bosworth, Purchasing Agent, has resigned his position. Charles D. Barrows, Mr. Bosworth's former assistant, succeeds him.

H. N. Webber has resigned as Division Foreman of the Oregon Ry. & Navigation Co. at Starbuck, Wash., to become General Foreman of the M. C. shops at Waterville, Me.

Mineral Range.—The following officers were elected at the annual meeting held at Marquette, Mich. on July 12: W. F. Fitch, President; W. E. Parnell, Vice-President; A. E. Miller, Secretary; E. W. Allen, Treasurer; George H. Church, Assistant Secretary, Assistant Treasurer and Transfer Agent.

Missouri Pacific.—C. E. Carstarphen has been appointed Commercial Agent, with headquarters at Fort Smith, Ark.

New York Central & Hudson River.—Clifford Lewis, Jr., has been appointed Inspector of Bridges on the Middle Division. It embraces the Mohawk Division, between Albany and Syracuse; the Adirondack Division, from Herkimer to Montreal, together with the Troy & Schenectady Branch of the Mohawk Division. Mr. Lewis was formerly Signal Engineer of the Mohawk Division.

New York, Chicago & St. Louis.—C. B. Hoyt, heretofore Roadmaster of the L. S. & M. S. at Adrian, Mich., has been appointed General Roadmaster of the N. Y., C. & St. L.

Norfolk & Western.—J. C. Connor, formerly with the Union Pacific, has been appointed Trainmaster of the Eastern Division, with headquarters at Crewe, Va., vice H. Burkholder.

Hiram Burkholder, Trainmaster at Crewe, Va., has been transferred to the Western Division with headquarters at Roanoke.

Omaha, Kansas City & Eastern.—J. H. Best has been appointed Assistant General Freight Agent with headquarters at Quincy, Ill.

Pennsylvania Co.—The office of J. F. Noland, Trainmaster of the east end of the Indianapolis Division, will be moved from Bradford to Columbus, O. J. W. Grennan, Trainmaster for the west end of that division will move his office from Indianapolis to Bradford.

Frederick B. Witt has been appointed Soliciting Agent of the Star Union Line at Columbus, O., effective Aug. 1. The position has been vacant since the resignation of Douglass Deahl.

Pittsburgh, Bessemer & Lake Erie.—We are officially informed that the report that J. T. Odell, General Manager of the P., B. & L. E., has resigned, is incorrect.

Port Jervis, Monticello & New York.—Hon. Thomas M. Waller, President, has resigned, effective Aug. 1, and is succeeded by Hon. Addison B. Colvin.

St. Louis, Chicago & St. Paul.—C. M. Stanton has been appointed Car Service Agent, vice D. C. Frederick, resigned.

San Diego, Pacific Beach & La Jolla.—S. C. Boutelle, Master Mechanic of this road, has resigned on account of ill health.

Seaboard Air Line.—F. W. Elliott has been appointed Contracting Freight Agent, with headquarters at Norfolk, Va., vice F. P. Jarvis, resigned. Mr. Jarvis will also take charge of the export traffic, and will be assisted by J. H. Flythe, Traveling Freight Agent, effective Aug. 1.

Southern.—G. W. Payne, Roadmaster, is transferred to the Columbia Division, vice G. W. Bartlett, resigned. C. E. Lindsay is appointed Roadmaster of the Washington Division, vice G. W. Payne, transferred.

Texas & Pacific.—Peter Lugenbuhl has been appointed Passenger Agent at New Orleans, vice Arthur De Armas, resigned.

Union Pacific.—John N. Baldwin of Council Bluffs, Ia., has been appointed Assistant to the General Solicitor, vice William J. Carroll, resigned.

A. O. Sumption, heretofore Station Agent at Albion, Neb., has been appointed Traveling Auditor, with headquarters at Salina, Kan. He will audit the accounts of the station agents on the Kansas lines.

W. J. Carroll, Assistant to General Solicitor W. R. Kelly, with office at Omaha, Neb., has resigned.

West Shore.—W. B. Yereance has been appointed secretary to Vice-President J. D. Layng.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

ATLANTIC COAST LINE.—Surveys are in progress for an extension southwestward of the Manchester & Augusta line, which now terminates at Denmark, S. C. It is said that the extension will be about 25 miles long, reaching the main line of the Charleston & Western Carolina. It is expected that the company will be ready to let contracts in September.

BRANDON & SOUTHWESTERN.—This proposed road is to run from Brandon, Man., southwest to Waskada, about 90 miles. Mr. Robert Waddell, the contractor, writes that the locating survey is finished and that grading will be begun this fall. There will be required one bridge 400 ft. long, which probably will be built of steel. No contracts for grading have yet been let. The contractor hopes to be ready to lay rails early in 1899. J. E. Evans is Chief Engineer. (July 22, p. 538.)

CANADIAN PACIFIC.—It is reported from Montreal that the proposed new railroad from Woodstock, Ont., eastward about 100 miles to Brantford, referred to in our issue of July 22 under "Canadian Roads," is to be built by the Canadian Pacific.

It is reported that the C. P. is to build a railroad from Pointe Fortune, Que., westward about 15 miles to Hawkesbury, Ont. Pointe Fortune is the northern terminus of a short line of the C. P. from Rigaud.

CAPE FEAR & NORTHERN.—The contract for building this new road in North Carolina has been let

to Gibson & Carpenter Bros. The company, organized last March, proposes to build a road from Raleigh, N. C., to Lillington, to open up a lumber region. The Raleigh News states that work will be begun by the contractors at Holly Springs, N. C., at once. J. C. Angier, Holly Springs, is General Manager. (March 11, p. 188.)

CHICAGO & NORTHWESTERN.—The second main track between Barrington and Harvard, Wis., is now substantially finished, completing a double-track line through from Chicago to Elroy, where the line connects with the Chicago, St. Paul, Minneapolis & Omaha. (April 1, p. 245.)

CHICAGO, PEORIA & WESTERN.—This is the name of a company incorporated in Illinois last week to build a railroad from Chicago southwest to Peoria, about 125 miles, thence northwest to Rock Island and also from Peoria about 100 miles northward, to Rockford. The capital stock is \$50,000, and the first Board of Directors are C. H. Matthiessen, S. D. Butler, W. J. Gorman and others, all of Chicago.

CHOCTAW, OKLAHOMA & GULF.—The business men of Little Rock, Ark., are making an effort to raise \$100,000 to aid in building an extension of this road from Wister Junction, I. T., eastward to Little Rock, a distance of about 130 miles. The present eastern terminus of the road is at Wister and the extension, seven miles, to Wister Junction on the Kansas City, Pittsburgh & Gulf, is now in course of construction. As noted in this column July 22 under "Little Rock & Memphis," there is a movement among the parties interested to consolidate the ownership of the C. O. & G. and the L. R. & M. If the 130-mile extension is built, the combined lines will make a through route from Memphis, Tenn., through Little Rock to the Indian Territory.

CINCINNATI, HILLSBORO & WELLSTON.—W. H. Loss, a Civil Engineer of Buffalo, N. Y., acting in behalf of eastern capitalists, has made an examination of the line of this proposed road. The surveys for this line were made in 1896, the line east of Hillsboro following that of a survey made in 1852. The project contemplates a railroad connection between Cincinnati and the coal fields in Jackson County. (July 31, 1896, p. 545.)

FLAT RIVER VALLEY.—This is the name of a company incorporated in Missouri July 28, to build a railroad from the Mississippi River, in Perry County, opposite Chester, Ill., and through the County of Ste. Genevieve to Farmington, in St. Francois County, and thence to Irondale, on the Iron Mountain Railroad, in Washington County, a distance of 60 miles. Among the incorporators are: C. B. Cole, C. H. Shannon and Edwards Whitaker. The capital stock is stated as \$600,000.

FLORENCE & CRIPPLE CREEK.—A press dispatch from Denver states that President S. T. Smith of this company is making arrangements to build an extension of the line northward. His plans contemplate 110 miles.

KNOXVILLE & BRISTOL.—W. C. Crozier, a Civil Engineer of Knoxville, Tenn., has been engaged to make a survey for this line from Knoxville to Bristol. This company is the successor of the Morristown & Cumberland Gap, and the existing line of the latter company, from Corryton northeast to Bean's Station, in Grainger County, will form a part of the proposed through line. Mr. Crozier has already made a preliminary survey from Knoxville to Blaine. (April 29, p. 318.)

MINNESOTA, IOWA & GULF.—This company, recently incorporated in Iowa, to build a line across the State from Minnesota to Missouri, has a number of agents in the field securing subsidies from towns, and the survey of the line is progressing rapidly. (July 22, p. 538.)

NEW ROADS.—S. Crawford & Sons intend building this fall about six miles of railroad, to be used as a logging road from Cedar River, Menominee County, Mich., northwest. The road will eventually be extended through to some point on the Chicago & Northwestern, and the land will be opened to settlers for farming. The firm will not let contracts for building. The town of Cedar River is at the mouth of the river of that name on Green Bay. The address of Messrs. Crawford is Pigson, Forest County, Pa. (Official.)

RALEIGH & CAPE FEAR.—Twelve miles of this new road are now completed. The line is being built from Raleigh, N. C., southeast through Wade, Johnston and Harnett Counties, to make connection with the new road projected and partly completed, several years ago, to Stanhope, 25 miles from Raleigh, where by the Atlantic Coast Line will secure an entrance into Raleigh. Last week the company ran an excursion train, the first train carrying passengers. Work is now being rapidly pushed, and it is said that the road will be completed by the fall. It is already equipped with one locomotive, one passenger car and a few freight cars.

RICHMOND, PETERSBURG & CAROLINA.—The directors of this road (Petersburg, Va., to Ridgeway, N. C.), have made arrangements for the completion of track laying from Stony Creek, Sussex County, Va. (to which point the road has been completed from Petersburg, a distance of 12 miles), to Ridgeway, without further delay. We understand that the Seaboard Air Line has arranged to lease this line for a term of years and operate it as a part of its main line.

SALISBURY BRANCH.—The extension of the Salisbury Branch of the Baltimore & Ohio from West Salisbury southwest 3.34 miles with a flag run branch of .77 mile to Niverton, in all 4.11 miles, is nearly completed. Messrs. Stuart & Keenan of Westminster, Md., have the entire contract. The work is very light. The maximum grade is 2½ per cent., and the maximum curve 12 degrees. There are four trestles, the longest being 600 ft. long and 18 ft. high, the highest being 34 ft. high and 250 ft. long. The rails were bought from the Baltimore & Ohio, which company will also supply the rolling stock. M. McDonald Price of Elk Lick, Pa., is among those interested.

SAN FRANCISCO & NORTH PACIFIC.—California papers report that the directors of this company, at a meeting July 20, made arrangements for building an extension to the road as soon as the war closes.

SOUTH CAROLINA & GEORGIA.—It is reported

that this company, in connection with New York, Cincinnati and Carolina capitalists, will soon take active steps toward the completion of a through line between Charleston and Cincinnati. Several years ago the greater part of the road was built, but went into the hands of receivers before its completion, with two broken links, 75 and 35 miles long, uncompleted. The Ohio River & Charleston, which forms most of the route, is believed to have been controlled in the interest of the S. C. & G. for some years.

SOUTHERN.—This company bid in the Knoxville, Tenn., Belt Line road at the sale of that property at Knoxville on July 26. The price paid was \$9,000. The property is said to have cost over \$60,000, and to now be worth \$50,000. It was a chancery sale.

TENNESSEE CENTRAL.—President Baxter is reported as saying that arrangements have been completed for beginning work at once on that portion of the road east of Monterey, Tenn. The grading on this part of the line was finished some time ago, except about 15 miles, and it is stated that the track can be completed so as to make a connection through to Knoxville within three or four months. Bids for the necessary grading have already been asked for. (July 8, p. 503.)

VALLEY CONNECTING.—A company by this name was chartered in Pennsylvania July 28 to build a line 0.87 mile long, in the County of Mercer, to connect the Stewart Railroad with the Erie & Pittsburgh. The directors are Samuel McClure (President), Charles F. Phillips, Edward W. Budd, Charles N. McClure, Sharon, Pa.; Fayette Brown, Harvey N. Brown and Dexter B. Chambers, Cleveland, O. Capital, \$10,000.

WISCONSIN & MICHIGAN.—Surveys are nearly completed for the extension to Menominee Range in Wisconsin, but the details are not yet all arranged.

Electric Railroad Construction.

ALMA, NEB.—Harlan County will build nine new bridges. S. L. Roberts, Clerk.

ALTON, ILL.—The Alton Ry. & Illuminating Co. will build an extension to East Alton.

BERLIN, N. H.—A company is being formed to build an electric railroad from Berlin to Gorham, five miles. The following are the projectors: A. M. Clement, C. P. Day, L. J. Cote and G. O. Holt.

BUFFALO, N. Y.—The Railroad Commissioners have approved the plans of the Buffalo Valley Ry. Co. for building an electric railroad from the city line at Clinton St., along the Buffalo River, to Java, 27 miles. (March 25, p. 225.)

CLINTON, MASS.—The town boards of Clinton and Concord have given franchises to the Clinton, Hudson, Maynard & Concord Electric R.R. Co.

CLINTON, N. Y.—The Sanquoit Valley Electric R.R. Co. has applied to the Board of Trustees for a franchise to build an electric railroad in Clinton.

COVINGTON, KY.—The Covington Transfer Co. has made application for right of way for its proposed railroad from Ludlow to Covington. A freight transfer house is to be built at Second St. and Madison avenue. It is stated that electric cars will also be run to carry passengers.

GRAND RAPIDS, MICH.—H. L. Van Benschoten of Belding, and a Mr. Temple of Grand Rapids, are interested in a project to build an electric railroad between Grand Rapids and Belding.

HARTFORD, CONN.—Local press reports state that George M. Dunham of Flemington, N. J., representing New York capitalists, bought at Hartford Aug. 1 the charter of the Suffield & East Granby Electric Railroad, which claims the rights in Connecticut formerly held by the Springfield & Southwestern St. Ry. Co. It is stated that Mr. Dunham and those with him hold the majority of the stock in the Southwestern, and they will control the route, no matter what may be the outcome of the quo warranto proceedings brought by the Suffield & East Granby road to determine why the Southwestern did not forfeit its charter. It is expected that the new owners will soon finish the Connecticut end of the road.

KALAMAZOO, MICH.—It is stated that Norton & Turnstall of 36 Wall St., New York, will finance the proposed connecting line of 27 miles from Kalamazoo to Battle Creek, to be built by the Michigan Traction Co. Preliminary surveys have been made on the line. Further work will probably be delayed until spring. (Sept. 17, '97; April 1, '98, pp. 659, 246.)

KANSAS CITY, MO.—The County Commissioners have granted a franchise to the Kansas City & Leavenworth Rapid Transit Co. to build an electric trolley road. H. S. Pert is President, and C. H. Chapin Secretary of the company.

LACONIA, N. H.—The Laconia St. Ry. Co. will adopt the trolley and build an extension to the Weirs. The company now operates about four miles of track.

LANCASTER, O.—The Fairfield Traction Co. is reported incorporated, with a capital stock of \$100,000, to build an electric railroad in Lancaster. Henry B. Peters and Wm. Davidson are interested.

MONTICELLO, IND.—The Tippecanoe Electric R.R. Co. was recently incorporated with a capital of \$50,000 to build an electric railroad. The directors are: Charles C. Spencer of Monticello; Emory B. Sellers, Louis G. Gustove, Clinton L. Bader and Henry Van Voorst.

NEW BEDFORD, MASS.—The Board of Public Works has granted a franchise to the New Bedford, Middleford & Brookton St. Ry. Co. to build an electric railroad in New Bedford. (Feb. 18, April 8; pp. 131, 266.)

PORTSMOUTH, N. H.—The Portsmouth & Dover Electric Railroad Co. has let contracts for building its power house at Noble's Island. Track laying will also be begun this week. (April 8, p. 267.)

ST. LOUIS, MO.—The directors of the Central Traction Co. have voted to increase the capital stock from \$100,000 to \$5,000,000. The Municipal Assembly recently passed an act giving the company a franchise covering a great many streets. R. M. Snyder, President of the Mechanics' Bank, Kansas City, Mo., and John H. Blessing of St. Louis are interested in the company. (March 18, p. 209.)

SANDUSKY, O.—It is stated that the Sandusky & Interurban Electric Ry. Co. has been incorporated to build from Sandusky to Lorain. Among the directors are E. W. Moore and H. G. Everett.

SPOKANE, WASH.—Press reports state that the United States Marble Co., owning quarries near Spokane, will build an electric railroad to carry material from the quarries to Valley, on the Spokane Falls & Northern. The officers are: C. S. Edwards, President, and H. B. Allen, Treasurer.

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net earnings for the periods ending at the dates named:

		1898.	1897.	Inc. or Dec.
Alleghany Valley.				
1 month.....	Gross	\$221,763	\$219,886	I. \$1,877
1 ".....	Net	87,508	92,374	D. 3,866
6 months.....	Gross	1,268,621	1,151,734	I. 116,887
6 ".....	Net	483,478	433,375	I. 50,113
Atchison, Topeka & Santa Fe.				
1 month.....	Gross	\$3,000,499	\$2,718,021	I. \$282,478
1 ".....	Net	691,638	436,717	I. 254,921
12 months.....	Gross	39,214,099	33,633,640	I. 5,580,459
12 ".....	Net	10,770,764	8,396,428	I. 2,374,336
Baltimore & Ohio.				
1 month.....	Gross	\$2,328,015	\$2,208,798	I. \$119,217
12 months.....	Gross	27,579,397	25,582,120	I. 1,997,277
Baltimore & Ohio Southwestern.				
1 month.....	Gross	\$523,010	\$531,420	D. \$8,410
1 ".....	Net	104,645	189,594	D. 84,949
12 months.....	Gross	6,885,028	6,140,000	I. 745,028
12 ".....	Net	1,996,237	1,882,696	I. 113,541
Buffalo, Rochester & Pittsburgh.				
1 month.....	Gross	\$325,096	\$258,427	I. \$66,668
1 ".....	Net	141,154	73,015	I. 68,137
12 months.....	Gross	3,706,105	3,347,276	I. 358,829
12 ".....	Net	1,339,690	1,093,820	I. 245,870
Canadian Pacific.				
1 month.....	Gross	\$2,138,110	\$2,000,577	I. \$137,533
1 ".....	Net	817,385	886,127	D. 68,742
6 months.....	Gross	11,586,272	9,712,694	I. 1,873,578
6 ".....	Net	4,133,677	3,667,193	I. 466,484
Central of New Jersey.				
1 month.....	Gross	\$1,054,067	\$1,026,082	I. \$27,984
1 ".....	Net	440,872	374,290	I. 66,582
6 months.....	Gross	5,747,813	5,526,192	I. 221,621
6 ".....	Net	2,043,597	1,809,355	I. 234,242
Chicago, Milwaukee & St. Paul.				
1 month.....	Gross	\$2,746,323	\$2,718,559	I. \$27,764
1 ".....	Net	1,003,338	1,093,782	D. 90,393
12 months.....	Gross	34,189,663	30,486,767	I. 3,702,896
12 ".....	Net	12,988,097	11,909,228	I. 1,078,868
Denver & Rio Grande.				
1 month.....	Gross	\$711,724	\$616,815	I. \$94,909
1 ".....	Net	283,948	277,408	I. 6,540
12 months.....	Gross	8,342,326	6,945,114	I. 1,397,212
12 ".....	Net	3,325,327	2,869,778	I. 455,549
Lehigh Valley.				
1 month.....	Gross	\$1,492,659	\$1,418,186	I. \$74,473
1 ".....	Net	310,974	244,701	I. 66,273
7 months.....	Gross	9,968,698	9,693,862	I. 274,836
7 ".....	Net	2,303,695	1,751,299	I. 552,396
Lehigh Valley Coal Co.				
1 month.....	Gross	\$1,155,950	\$1,233,520	D. \$77,570
1 ".....	Net loss	110,474	3,074	I. 107,400
7 months.....	Gross	8,000,104	7,837,838	I. 162,266
7 ".....	Net loss	441,846	291,436	I. 150,410
Mexican Central.*				
1 month.....	Gross	\$1,104,257	\$1,080,805	I. \$23,452
1 ".....	Net	382,263	315,725	I. 66,538
6 months.....	Gross	6,739,294	6,567,753	I. 171,541
6 ".....	Net	2,161,240	2,191,517	D. 30,277
*Mexican currency.				
Mexican International.*				
1 month.....	Gross	\$271,929	\$236,829	I. \$35,100
1 ".....	Net	111,215	87,969	I. 23,246
6 months.....	Gross	1,665,972	1,542,766	I. 123,206
6 ".....	Net	637,707	588,775	I. 48,932
*Mexican currency.				
Pennsylvania.				
1 month.....	Gross	.....	.....	I. \$63,100
1 ".....	Net	.....	.....	D. 33,200
6 months.....	Gross	.....	.....	I. 1,774,000
6 ".....	Net	.....	.....	I. 57,600
Pennsylvania Co.				
1 month.....	Gross	.....	.....	D. \$37,400
1 ".....	Net	.....	.....	D. 355,700
6 months.....	Gross	.....	.....	I. 2,063,800
6 ".....	Net	.....	.....	I. 11,500
St. Louis & San Francisco.				
1 month.....	Gross	\$506,779	\$468,490	I. \$38,289
1 ".....	Net	173,382	138,812	I. 34,570
12 months.....	Gross	6,886,468	5,993,336	I. 893,132
12 ".....	Net	2,856,359	2,509,708	I. 346,651

AUGUSTA SOUTHERN.—This road was placed in the hands of a temporary receiver on July 20 by Judge Calloway, at Augusta, Ga., at the instance of the officers of the road. The line was leased some time ago by the South Carolina & Georgia, and the object of the receivership is to break the lease. The Augusta Southern alleges that the lessee has not carried out the agreement, in that it has permitted the road to deteriorate instead of bettering it as agreed; that good rolling stock has been replaced by inferior cars and locomotives, and that the lessee has sought to decrease the value of the road in order to buy it at less than its real value. The line runs from Augusta, Ga., to Tennille, 84 miles.

BALTIMORE & OHIO.—The first preferred stockholders, at a meeting held at Baltimore, July 28, 24,000 of the 30,000 shares being represented, decided that all should join in asking the courts for an injunction restraining the company from carrying out the reorganization plan until the status of the first preferred stock shall be determined by the courts. Ten thousand of the shares are held by the Johns Hopkins University, and 1,100 by the State of Maryland. The State Treasurer represented the State at the meeting. (July 8, p. 504.)

CHICAGO, FT. MADISON & DES MOINES.—Judge Woolson, at Ottumwa, Ia., July 28, appointed General Manager E. F. Potter receiver of this road. The line runs from Ft. Madison, Ia., to Ottumwa, 71 miles. Its capital is \$1,970,200, and its funded debt \$1,313,000. The complainant is the American Loan & Trust Co., and the January interest has not been paid. No earnings have been reported since 1896, when the net income was \$31,759 and the

charges \$65,650. At that time the floating debt was \$29,000.

HUTCHINSON & SOUTHERN.—A petition has been filed in the United States Circuit Court at Wichita, by F. C. Smith of Colorado Springs, for the appointment of a receiver for the road.

INDIANA, ILLINOIS & IOWA.—The stockholders will meet Sept. 13 to vote on a proposition to consolidate this company with the Indiana, Illinois & Iowa of Indiana, which owns the 34.55 miles from Knox to South Bend, Ind. This portion is now operated by the parent company under a 99 year contract.

LOUISVILLE & NORTHWEST.—The Magnolia Branch of the St. Louis Southwestern, extending between McNeil, Ark., and Magnolia, a distance of six miles, has been leased and, after Aug. 1, will be operated by this company.

MANHATTAN (ELEVATED).—In the review by certiorari of the reassessment at \$15,500,000 of the tangible taxable assets of this company for the year 1894 by the Tax Commissioners of the City of New York, Hamilton Odell as referee has reported that the company was not liable to assessment by the local authorities on the first Monday of January, 1894. The referee sustained the position of the railroad company upon all the contentions. He fixed the value of the company's real estate at \$3,700,000, in place of \$14,000,000, and reduced an item of \$6,000,000 for accounts receivable to \$2,000,000, and allowed the latter only because of an admission of counsel. He reduced the gross valuation of the taxable tangible assets to \$27,000,000 from about \$38,000,000 and found that after adding the real estate assessment of \$7,000,000 to deductible bonded indebtedness and deducting the sum there was no surplus left of tangible taxable assets. The amount of taxes involved is \$700,000, and the Corporation Counsel will, it is understood, continue the contest by appeal.

OHIO RIVER & CHARLESTON.—At the foreclosure sale of this road at Marion, N. C., Aug. 2, the property was bought by a new company composed of the bondholders represented by the Finance Co. of Pennsylvania. The amount of the bid was \$891,010. President Samuel Hunt of the Purchasing Committee was the only bidder. It is said that the line will now be extended from Marion, N. C., northwest about 80 miles to Johnson City, Tenn. (Aug. 27, 1896, p. 611; July 1, 1898, p. 486.)

PEORIA, DECATUR & EVANSVILLE.—A bill asking for the foreclosure of the first mortgage and the appointment of receivers under it was filed in the United States Circuit Court at Springfield, Ill., July 30, by the Central Trust Co. of New York. The first mortgage amounts to \$1,287,000. (April 8; July 15, pp. 267 and 523.)

RICHMOND, NICHOLASVILLE, IRVINE & BETTYSVILLE.—The adjourned sale of this road is now appointed for Sept. 6. The upset price will be the same as before, \$100,000. (July 22, p. 540.)

SEABOARD AIR LINE.—A committee composed of William H. Blackford and others of New York, has promulgated a plan for the readjustment of the debt of the Carolina Central, one of the sections of the S. A. L. The plan provides for an issue of \$3,000,000 of 4 per cent. first mortgage bonds, \$500,000 5 per cent. non-cumulative preferred stock, and \$500,000 common stock. If a second mortgage is to be put upon the property the \$500,000 of preferred stock is to be made a part of it. The new bonds will be guaranteed by the Seaboard & Roanoke and the Raleigh & Gaston. Security holders are asked to deposit their holdings with the Farmers' Loan and Trust Company of New York on or before Nov. 1.

TERRE HAUTE & INDIANAPOLIS.—Judges Woods and Showalter, in the case of this company against Benjamin Harrison, as trustee of the Terre Haute & Logansport, have sustained the decree of the United States Circuit Court authorizing Mr. Harrison to foreclose a trust deed of \$1,000,000 on the bond issue of the T. H. & I.

WISCONSIN CENTRAL.—Application has been made in the United States Court at Milwaukee for the appointment of a receiver for the Wisconsin Central Railroad Co., which is that part of the Wisconsin Central lines which has hitherto remained solvent. The present proceedings are due to differences between Trustees Abbott and Stewart. The bill is based on the bonds of 1871, amounting to \$8,989,500. Interest has been regularly paid on a small part of these bonds, but on the first series no interest has been paid since July 1, 1896. On the second series no interest has ever been paid. (June 17; July 29, pp. 446 and 556.)

TRAFFIC.

Traffic Notes.

Western papers report that the Commercial Travelers' Association is now making a determined effort to get the railroads to reduce the rates for extra baggage.

The fare between Cripple Creek, Col., and Colorado Springs has been reduced from \$4.20 to 25 cents in consequence of a violent war between the Florence & Cripple Creek and the Midland Terminal.

Through eastbound shipments of freight from California for the month of June amounted to 53,797 tons, as compared with 43,026 tons in June, 1897. This includes only shipments from places north of Tehachapi.

The Atchison has given orders to division agents not to allow its freight cars to leave the line whenever it is possible to transfer contents at junction points. All available cars are being accumulated for handling the grain crop.

The Journal of Commerce (New York) reports that the number of first cabin passengers from America to Europe this season has been about 8,000 less than last year, and in second cabin and steerage there has been a falling off of 7,500, and 1897 was not a heavy year.

The Canadian Pacific has made a reduction of 1½ cents in the rates on grain from points west of Ft. William. This is in accordance with one of the stipulations in the subsidy recently granted the road by the Government for the construction of the Crow's Nest Pass Railroad.

The Union Pacific having objected to the inclusion of trans-Missouri territory in the jurisdiction of the Western Passenger Association, steps are being taken to form another association, to be known as the Trans-Missouri Passenger Association, covering the territory from the Missouri River to the Pacific coast.

Several meetings and conferences have been held the past week between representatives of the Joint Traffic Association lines in an endeavor to reach an agreement in respect to passenger fares between Chicago and New York. No definite action is likely to be had until the Board of Managers reassembles next month.

The News, of Macon, Ga., reports that 100 cars of peaches are likely to be wasted in that State this year for lack of crates. The crop was underestimated by both growers and shippers, and there has been a good deal of annoyance from a lack of refrigerator cars. At Fort Valley and Marshallville the shipments up to July 25 had already equalled the amount that had been estimated for the whole season.

The Railroad Commissioners of Texas have issued a notice warning the railroad companies of the state against refusing to accept freight from connecting lines on account of disputes concerning the division of through rates. The Commissioners hear that freight has been delayed pending the settlement of questions of this kind, and the notice says that willful detention, heretofore frequently complained of, will not be tolerated.

On July 30 application was made to have the North Carolina Railroad Commission recede from its action taken in ordering the reduction of passenger rates on the Wilmington & Weldon. The commission refused to accede to the request. This is the only road in the state on which a reduction was ordered. The case of the Raleigh & Gaston, on which action was suspended in this matter at the previous session, was again postponed.

Wichita, Salina and other towns in Kansas recently appealed to the State Railroad Commissioners to order reductions in the railroad rates for the transportation of coal, and a hearing was appointed for July 22, but when the day arrived a large company of town officers, railroad lawyers and traffic managers gathered at Topeka, and, after several conferences, agreed upon a compromise in the matter of rates, so that the Commissioners made no investigation. Rates to Wichita were reduced about 12 per cent., to Salina 10 per cent., and to other towns in about the same proportions. It is said that the most of the rates were reduced from a basis of 11 mills per ton per mile, to 8 mills. One town, Osage City, refused to compromise and the Commissioners heard a statement of the case, but later it was reported that an agreement had been reached.

Observations of a Chicago Traffic Officer.

Railroad traffic officers in the West now have a good many problems to think of in their spare moments (if, indeed, some of the questions do not intrude themselves when current business is under discussion), and some of these problems seem likely to shift around a good deal before they are settled.

The new grain crop has already commenced to move. The varying currents of the export trade, by Gulf and by the lakes, have not yet assumed sufficient definiteness upon which to base estimates, but the Gulf lines reach further into the Northwest year by year, and the reconquest of the traffic by the lake lines and by the eastbound all rail lines from Chicago does not seem likely.

During the last few months the Gulf lines experienced some losses and interruptions in consequence of the war, but this impediment to that route is now past, and the contest for business will be conducted on a normal basis. Evidences of activity in the Gulf trade are now appearing.

The large grain elevators built at Buffalo by the Great Northern, and at Erie by Chicago grain men, are likely to permanently reduce the cost of transfer at those points, and thus help the lake trade as against the Gulf route. It is said that transfer charges have been reduced from 7½ mills to 2½, and it is even claimed that this charge has, in some cases, been wholly absorbed. This cheapening of the through rate by lake may benefit the Western lines terminating at Chicago, but on the railroads east of Chicago it has just the contrary effect. This has already been felt. Whether the lakes will regain their old advantage in the East-bound grain traffic is still an open question. The railroads have in recent years proved strong competitors, but with the economies in transfer charges and with the greatly reduced lake rates made possible by using larger vessels the immediate outlook is for a more persistent struggle than for some years past.

The diversification of farming in Illinois has caused great changes. In the primitive days of railroading in Illinois the chief freight was corn. A few years later the farmers began to raise hogs and the railroads lost tonnage, although they got the carriage of the hogs. Financial losses were large, but the gradual increase of prosperity among the farmers has partly made up for them.

The extension of the Cotton Belt to the Northwest is favoring the Western roads. A few years ago Dallas, Tex., was one of the points marking the northern boundary line of this belt. Now cotton is shipped from Oklahoma and from Kansas, and each year the production is crawling a little further northward. From Wichita, Kan., cotton is now regularly shipped. Some of it goes by transcontinental routes to the Pacific Coast for Japan, where cotton mills are becoming important.

There are this year some unusual currents of trade in coal. The West Virginia miners are aggressively reaching out into fields to which their coal has heretofore been a stranger; not because of any circumstances within the control of the carriers, but to the lower cost of production in that State. The lake trade in the Northwest is also gaining at present at the expense of all-rail shipments from Western mines. The boundary line for Illinois coal is many miles nearer home than it was last year.

Railroads do not get much benefit from the new era of export trade into which this country has entered; but even as far west as Chicago there are some evidences of the new business. Shipments of heavy machinery and other miscellaneous freight from Chicago to the Pacific Coast for exportation are becoming increasingly frequent.

Freight business as a whole promises well for this autumn, and every road is putting all its freight cars and engines into the best condition. In addition to this many companies are buying new cars.